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ABSTRACT

This course is the fifth of seven in the Information Systems curriculum. The purpose of the course is to build on skills acquired in the earlier courses. It reviews the importance of information to management and the organization and information systems concepts within an office. These components are provided for each task area: behavioral objective, suggested teaching strategies, content, and summary. Topics covered include principles related to the importance of information, information resources management, and change; recognition, discussion, and research of proposed solutions and/or compromises for given problems in office automation; development and application of problem-solving techniques; information gathering to write and present oral and written reports for a variety of information systems problems and recognition of the value of teamwork; and application of problem-solving and project planning techniques. Appendixes include visuals (transparencies and other teacher materials), student materials (student handouts, work sheets, and exercise materials), evaluation (end-of-task and end-of-unit questions, test items, etc.), and references (including articles and an eight-page bibliography). (YLB)

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ED299428

Applied Information Systems

course five

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In Cooperation with
ASSOCIATION OF INFORMATION SYSTEMS PROFESSIONALS
(AISP)

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Glen R. Anderson, AISP Executive Director, Deerfield, IL
Claudia Bryan, AISP National President, Sugar Land, TX
Allan J. Krueger, AISP National Director, Acton, MA

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APPLIED INFORMATION SYSTEMS

This course builds on skills acquired in Computer Business Applications II, Database Systems, and Telecommunications/Networking. An in-depth, structured problem solving approach is applied in project teamwork. The course begins with a review of the importance of information to management and the organization, as well as information systems concepts within an office. The elements of the organization become the framework within which problems may be encountered and solutions derived by applying concepts and methodologies. Problem solving techniques are reviewed in order to develop an effective approach to handling problem situations within an automated environment.

Problems (class projects) related to the following areas are included, but are not limited to, overcoming incompatibility of equipment, lack of training and documentation support, lack of documentation for the acquisition of hardware or software, lack of vendor support and knowledge, expandability miscalculation, lack of concern for physical and data security, lack of concern for the effects of change on individuals in the automated office, lack of standards and procedures for document designation, and others.

This course remains open to new and changing elements within information systems and suggests instructor techniques and sources for adding to, deleting, and improving the content of the course. Oral and written communications skills and teamwork are required of students to complete projects.

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VISUALS

Includes transparencies and other teacher materials.

STUDENT MATERIALS

Includes student handouts, work sheets, and exercise materials.

EVALUATION

Includes end-of-task and end-of-unit questions, test items, etc.

REFERENCES

Includes bibliography, articles, resources, etc.

INSTRUCTOR NOTES

APPLIED INFORMATION SYSTEMS

CONDITION	PERFORMANCE/STANDARD
TASK AREA 1: Given a list of principles related to the automated office, management, information management, and change,	the student will be able to review the concepts and principles related to information and information management, as well as changes in the work and work place which have been brought about by automation to the satisfaction of the instructor.
	Specifically important to this review are the role of information, ethics of dealing with information, ownership of information, and the significance of high tech/high touch.
TASK AREA 2: Given specific problem/challenge situations for the automated office,	the student will be able to recognize, discuss, and research proposed solutions and/or compromises for the problem/ challenge situations to the satisfaction of the instructor.
TASK AREA 3: Given a specific problem situation within the automated office,	the student will be able to 1) define the problem, (2) use the problem solving steps: collect data, involve the right people in the process, analyze the facts, develop possible solutions, select alternatives, make the decision, and evaluate the solution and decision; and 3) practice using the problem solving and decision making processes as they relate to problems in information systems to the satisfaction of the instructor.

CONDITION	PERFORMANCE/STANDARD
TASK AREA 4: Given a variety of information systems problems,	the student will be able to establish standards for formats to be used in written and oral reports (individually and in groups) and discuss the value of teamwork to the satisfaction of the instructor.
TASK AREA 5: Given a variety of information systems problems,	the student will be able to apply problem solving techniques to information systems challenges, including overcoming the incompatibility of hardware and software; assessing the need for documentation and training support for end users of hardware and software; developing the procedures for safeguarding and protecting information and automated equipment; searching for vendor support and reliability such as debugging and documentation; using planning and organizing skills for implementation of and/or upgrading of automated systems to continue to meet the needs of the organization; designing the layout for implementing information systems applications within the automated office; and others to the satisfaction of the instructor.

APPLIED INFORMATION SYSTEMS

Task Area 1

Given a list of principles related to the automated office, management, information management, and change, the student will be able to review the concepts and principles related to information and information management, as well as changes in the work and work place which have been brought about by automation to the satisfaction of the instructor.

Specifically important to this review are the role of information, ethics of dealing with information, ownership of information, and the importance of high tech/high touch (Naisbitt, Megatrends).

Suggested teaching strategies: Lecture and discussion, outside readings by students, outside speakers.

Beginning assignment:

Students will read at least two articles from current administrative/management journals regarding the changes in traditional forms of management and organizational structures brought about as a result of automated equipment, access to information, information ownership, ethics related to management and ownership of information, skills needed in the automated office. Students will be expected to contribute to the discussion based on their outside readings. Considering the rapid changes that are occurring in the work place, you may want to assign specific readings, such as traditional principles of management, organizational patterns, control/communication, information systems management, information ethics and security, privacy, and information systems skills.

THE IMPORTANCE OF INFORMATION

Even as these words are being written, changes are occurring in technology which will affect how the office--generally where information is the key product--will handle work, how workers will perform the work, and how the organization will be structured to manage the work. These changes are primarily due to the increasing demand for information and the need of business and industry to control the flow of information in an ever-competitive world market.

In the context of the evolving automated office, information is data (in the form of words, numbers, symbols, graphics, voice, video) that express an idea or that can be meaningfully interpreted. Why is information vital to an organization and management? It is the lifeblood of the organization at all levels and may appear in many formats: production schedules, management's philosophy toward employees, payroll, vacation schedules, work schedules, sales quotas and sales quotations, personnel manuals, procedures and policies, personnel data, annual reports, memos, etc. To be meaningful to an organization, information in any form must be accurate, accessible, and timely.

Information is one of the most important assets of an organization. The challenge of accessing, manipulating, and processing data into usable information for effective decision making will become even more critical as the amount and availability of data increase.

Where have all the data come from and why are they much more accessible and available today? Automated, electronic storage technology has made it possible to store and retrieve vast amounts of information in private databases, as well as in public databases which are becoming more accessible. Telecommunications and networking capabilities have made it possible to send and receive vast amounts of information instantaneously. Desktop, microcomputer technology is making it possible to access and manipulate these data in the professional workstation for effective and timely decision making. As Marshall McLuhan said many years ago: "The medium is the message." The only limitations may be budgets, lack of foresight, and human imagination as it relates to what kind of, how much, and when information is accessible.

Alvin Toffler (The Third Wave) and John Naisbitt (Megatrends) address the shift from an industrial society to an information society as one of the major transformations that has taken place in the twentieth century. It is this shift from the focus on manufacturing to the processing of information that is having an effect on the organizational structure and work flow. Peter Drucker (The Frontiers of Management) describes the change in the structure of the organization as one in which "information serves as the axis and as the central structural support." The attention and emphasis given to the emergence of an information society has focused on the fact that larger percentages of the work force are involved with manipulating information--facts, figures, and speculations--not objects. According to Drucker, information is becoming the organizing energy with the capital resource being knowledge.

The key to the transition from an industrial economy to an information economy has been the computerization and automation of the work functions. Often the word "revolution" has been used to describe the impact of the computer, especially the microcomputer, because it not only connotes change, but it also implies rapid change. Increasingly sophisticated tools enable information to be produced, processed, stored, and transferred. In turn, these tools are affecting job design, work group structures, and individual and organizational performance. In a recent article by Rumberger and Levin (1985), they state:

> this transformation is part of a continuing process of technological change that has been going on throughout the nation's history. Past technical developments reduced the labor requirements of farming and transformed work in the factory. Today's rapid developments in microelectronics, biological sciences, and other "high-tech" areas are transforming work in virtually all sectors of the economy.

White-collar workers, which include managerial, professional and technical, secretarial and clerical, and sales workers, are now being referred to as "information workers" by the Bureau of Labor Statistics. At the present time, they make up the majority of the work force which exceeded 55 million in 1985. This category is expected to grow by another 5 million in 1990 and top 65 million in 1995. Since an increasingly larger proportion of the work force will be involved in the processing of information, there will be a profound effect on the primary locus of information work: the office.

The traditional definition of "office" as the focal point for the origin of business transactions is changing as computer-based technology allows geographically dispersed individuals and work groups to jointly carry out tasks which handle information. As information technology continues to change the way that work in the office is accomplished, the concept of an office as a location may become secondary to the concept of an office as a system of people working together. Ruprecht and Wagoner (Office Automation: A Management Approach) state that "the office function can be performed in any location within an organization...the truly integrated electronic office is not a destination, but a journey...always under development."

The overriding premise on which these points are based is the element of change: change in work environment, traditional role relationships, traditional terminology and principles, and traditional procedures and practices. It may be necessary in the future for office workers to live with more and more ambiguity as information continues to bombard the office and the senses from many directions. Flexibility will become one of the most important assets an information worker can possess.

THE MANAGEMENT OF INFORMATION

Information management is the process of planning, organizing, directing, and controlling the kind of, amount of, access to, and manipulation of information into usable formats for organizational consumption. Information management is, has been, and will continue to be the business of the office. Electronic office technology has increased the amount and availability of, access to, and demand for information in an organization. Organizational structures are being changed to accommodate the flow of information.

Information in the office traditionally flows between and among office components along formal and informal channels. Flows of information disseminate organizational goals and missions, forge the linkages between organizational units and assist the coordination and integration of the complicated interactions between specialized tasks. To enhance the flow of information, organizational staffing patterns and procedures are developed to accommodate the various business functions or systems of accounting, finance, purchasing, sales, inventory, production, and staff functions, as well as the social system. Staffing patterns and procedures often control the quality and quantity of information.

The traditional organization (shown in Figure 1) basically has rested on command authority; i.e., the flow of authority has been from the top down. The military structure provided this example which many organizations adopted as their own. Businesses lived (and thrived) with the hierarchical structure and accommodated the people to it. It was the right organizational structure at the right time.

A Traditional Organizational Structure

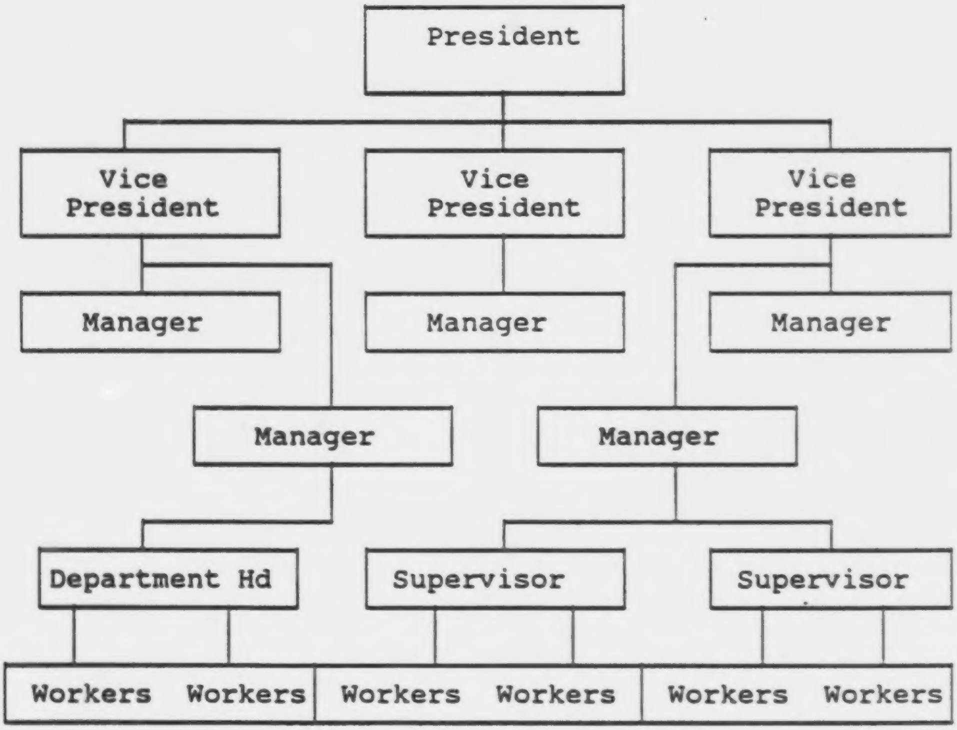
President
Vice President
Vice President
Vice President
Manager
Manager
Manager
Manager
Manager
Department Hd
Supervisor
Supervisor
Workers
Workers
Workers
Workers
Workers
Workers

Figure 1.

However, the success of an information-based organization may depend on asking and answering new kinds of questions arising from the ability to access and "control" information at all levels of the organization, as pointed out by Peter Drucker:

> What should the company expect of me and hold me accountable for in terms of performance and contribution? Who in the organization has to know and understand what I am trying to do so that both they and I can do the work? On whom in the organization do I depend for what information, knowledge, specialized skill? And who in turn depends on me for what information,

> knowledge, specialized skill? Whom do I have to support and to whom, in turn, do I look for support?

In comparison to yesterday's organization, access to information by all levels of employees may be creating a flatter organization with fewer levels of management. Peter Drucker describes the flatter organization as making irrelevant the principle of "span of control" and replaces it with a new principle he calls "span of communications". The number of people reporting to one person is limited only by the willingness of the workers to take responsibility for their own communications and relationships, upward, sideways, and downward. The questions mentioned above relate directly to this span of communication and to the importance in the organization of the person who can access and manipulate the information for timely consumption and decision making.

Several forms of organizational structures may evolve which focus on the importance of the individual in the information management process: a matrix form (Figure 2), whereby a person may report to a number of people depending on the ability to access and communicate information; or a reticular organization (Figure 3) where the distribution of information and authority is fluid and it shifts as required. In an information-based organization, the flow of authority is circular (having width as well as depth) from the bottom up and then down again.

These two organizational forms are illustrated below:

A Matrix Organization Structure

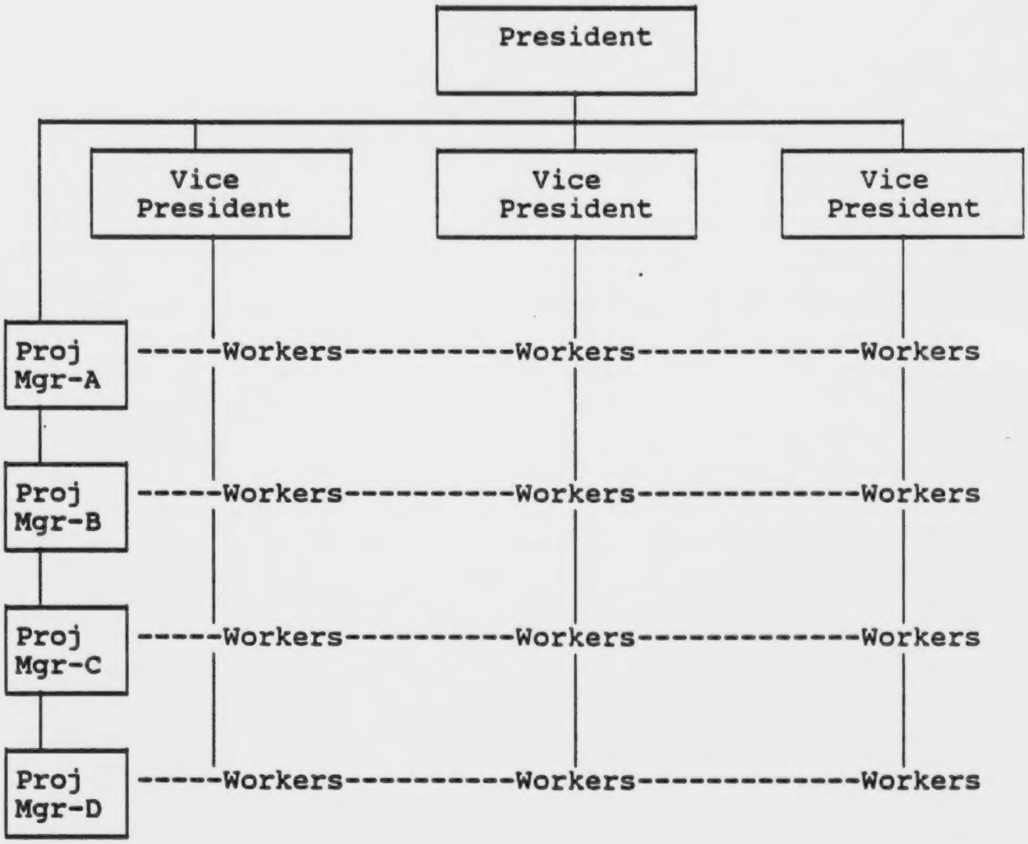
President
Vice President
Vice President
Vice President
Proj Mgr-A
Proj Mgr-B
Proj Mgr-C
Proj Mgr-D
-----Workers----------Workers-------------Workers
-----Workers----------Workers-------------Workers
-----Workers----------Workers-------------Workers
-----Workers----------Workers-------------Workers

Figure 2.

(In a matrix organization, workers come together from different functional or line organizations, retaining formal relationships with their own departments, and establishing dotted line [informal] relationships with the newly created department.)

A Reticular Organization Structure

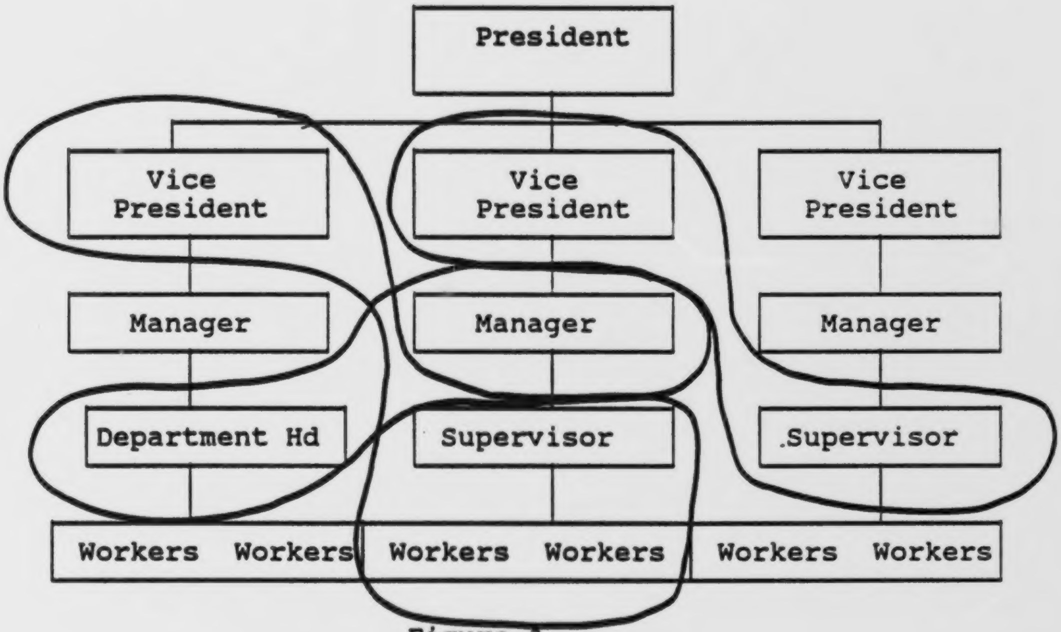
President
Vice President
Vice President
Vice President
Manager
Manager
Manager
Department Hd
Supervisor
Supervisor
Workers
Workers
Workers
Workers
Workers
Workers

Figure 3.

(The reticular organization may not look different from outside of the organization; however, inside the organization, each newly formed coalition is based on trade-offs, collaborations, technical expertise, and social needs brought about by technological changes or the nonroutine tasks of the office.)

These organizational forms may not alter the appearance of the organization chart to the outside world; but they will have profound effects on the people, role relationships, and job skills inside the organization.

Implementation of these organizational forms can be seen when top management asks an employee with the most knowledge of computers to research the purchase of the company's first computer system for its applications, such as word processing, spreadsheet, database management, etc. This employee, who may not have had previous management experience, may be given a budget and the authority to buy the system. OR Work teams of administrative support personnel from various departments in the organization who are familiar with computers may be asked to upgrade and/or expand the present computer system with the support (budgetary) and authority from top management. These personnel also may be expected to install the system, master the applications, and train others in the organization.

Other internal organizational patterns for accommodating an organization's information system represent points on a continuum, as follows:

> At one extreme is complete centralization: all systems analysis and design are performed by a central group and all equipment is operated centrally...and data are located and controlled centrally. At the other extreme is complete decentralization: all equipment and staff reside at local sites...data are decentrally located and controlled. [The third alternative] distributed processing occurs when central and local sites are tied together in some type of communications network that permits resource sharing.

The benefits to the organization of each of these patterns is the development of a structure in which information flows in and out in a timely manner, reflects the organization's purposes, and enhances productivity. A basic understanding of the relationship among the various subsystems is provided within the totally integrated information processing system in order to understand the whole system. Being able to see the connection between the goals of the organization and the environment in which work is carried out to meet the goals will provide an insight into the role of the individual and technology in meeting the needs of the organization.

Information resource management (IRM) is another approach to information systems management that is gaining support. IRM is a term coined by the firm of Booz, Allen & Hamilton. With IRM, responsibility for management of all information rests in one department, usually the Management Information Systems or Computer Information Systems or Administrative Services--but the resources themselves are distributed throughout the organization. Information resources include telecommunications systems, records management systems, reproduction, graphics and publishing systems, and all computers systems. The purpose of IRM is to ensure the most effective utilization of resources by all employees, to develop standards for compatibility of software and hardware, to make recommendations for purchases of equipment, to train end users, and to promote general systems analysis and development. In this way, the most effective use, as well as purchase, of these resources can be ensured.

The need for this kind of coordination of an organization's information resources has been brought about by the proliferation of personal computers and applications software which make it possible for many users to access an organization's databases. Centralizing the responsibility for overseeing the internal connectivity and communication of data, setting up standardized procedures, establishing security and ethics standards, and establishing guidelines for purchasing and installing equipment enhances the organization's information systems management effectiveness. It also has opened up new career opportunities and career paths for information workers.

Technology in hardware and software is changing so frequently that it is impossible for each individual employee in an organization to keep up with it. However, the information resource management approach places the responsibility for up-to-date information in one central location within the organization. Library facilities of an IRM department can contain vendor catalogs, computer equipment and supplies catalogs, computer-related magazines and books, and manuals for software and hardware utilized throughout the organization. It may be the source of computer information for all levels of employees.

Another function of the information resource management center is to test, evaluate, and troubleshoot new and existing systems. In this way, time on the job is not taken away from the user, the organization does not lose valuable information or business through faulty systems, and problem areas can be discovered, anticipated, and avoided prior to installation or upgrading. Hardware and software can be installed with a positive, healthy sense of what it can do for the end-user.

Being able to see the connection between the goals of the organization and the environment in which work is carried out to meet the goals will provide an insight into the role of the individual and technology in meeting the needs of the organization. This is a prime consideration of the IRM.

Summary. The organizational structures discussed above may not appear different to the outside world. However, within the organization, assigned responsibilities, work group opportunities, enhanced job duties, creation of new social and work groups, and flow of information and communication may create exciting changes in job structures and reporting structures. Whether the organization displays the traditional organizational structure to the outside world or chooses to flatten its hierarchical structure, the important factor to accept is change: change in job responsibilities, change in job structure, job in reporting structures, change in job skills, and change in technology. In order to remain a viable employee for the future, flexibility is the vital skill.

THE OWNERSHIP OF INFORMATION

Who "owns" the data in the organization? This is becoming a key question and critical issue because of the amount of available information. "Data ownership" is a common source of political strife and strikes at the heart of an organization's information ethics, values, and standards. It is an issue that many organizations have or will be addressing in the future. Some of the questions and issues which arise include:

> Does corporate data "belong" to the organization as a whole or to the user area that updates the data base? Should there be a single data base administrator to play traffic cop for all corporate data? Which elements are really sensitive and which are sensitive only in the eyes of the self proclaimed "owner"? All users want access. But often what data sharing means to users is that they want access to someone else's data, not that they want someone else to access theirs.

These are some of the questions and issues which must be answered and dealt with as the amount of and availability to information continues to grow. Numerous newspaper reports have been written regarding the ability of "hackers" to access sensitive and private data banks. (Has everyone seen "War Games"? Is it fiction or fact?)

Passwords, back-door passwords, encryption, dumb terminals, and security systems are becoming more and more prevalent as management begins to grope with the issues of information management and access. Several of the issues related to ethics, security, and information ownership are discussed in the paragraphs below.

Data Security. Most organizations have safeguards against unauthorized use of the information in their databases. No matter how secure data are, sometimes data can be tampered with illegally and even stolen. Within an organization, there are many types of information which should remain confidential: salary, health, benefits, production and trade secret agreements, etc. Access to an organization's personnel records database by certain departments or by certain persons requires careful attention to passwords and codes which will provide only that portion of the information needed by that department.

Many news stories in recent years have focused on persons who have gained access to data maintained by business and government organizations. This is a criminal act and they can be and are being prosecuted for it. For these reasons, organizations have installed passwords, encryption techniques, and key cards or combination codes for accessing data and computer facilities. Organizations are having to deal with other computer crimes such as employee sabotage of database information and/or stealing of information from corporate databases for profit.

How safe is information stored in an organization's computer database? Is it a good idea for an organization to place all of its information in a database?

Individual privacy. These issues are coupled with the concern for personal privacy. Organizations sell their databases or share the data with other similar organizations. A person's name may be listed with an organization which is embarrassing for that individual; e.g., a person may be listed as a member of a political organization from which he/she has resigned due to a change in political viewpoint. If the organization's list is sold to another entity, that person's name may still be on the list.

Recent legislation has been forthcoming regarding some of these issues:

(a) Personal data issues. One law, Federal Privacy Act, passed in 1974, has established limits on the personal information that is kept in government files. This law is intended to prevent any misuse of information about individuals in governmental files. This law is based on the CARTS principle that personal information in federal files must be Complete, Accurate, Relevant, Timely, and Secure. Another law, Freedom of Information Act, passed in 1966, gives people the right to see data that government agencies and businesses are keeping about them. Still another, the Fair Credit Reporting Act, passed in 1970, gives individuals control over the distribution of data about themselves. This law allows people to see the credit records that businesses keep about them.

(b) Two other privacy acts have been enacted to ensure privacy of student records and financial information: The Education Privacy Act, enacted in 1974, ensures the privacy of students records on file with schools that receive federal funds. In most cases, students are asked if their names can be given to outside agencies. The Right to Financial Privacy Act, passed in 1978, gives individuals the right to review information about themselves that is maintained by banks, credit bureaus, and other related financial institutions.

(c) The Federal Copyright Law, passed in 1976, makes duplicating commercial software disks without permission of the publishers as illegal as copying and distributing photocopies of documents and books. This is called software piracy. Hundreds of millions of dollars are lost by manufacturers of software programs because software is being copied for friends, neighbors, and co-workers. This kind of crime is hard to detect; manufacturers are having to rely on the personal integrity and ethics of individuals to deter this crime. Other more drastic measures may include using software encryption to alter a software program when it is copied or putting software programs on firmware chips which are built into computers and cannot be copied.

Individuals and organizations which do not recognize or obey these laws are displaying unethical behavior. However, many times it is difficult to prove that laws are being broken; or else the cost of enforcement may outweigh the benefits. It is imperative that organizations and individuals within the organization publish and maintain a set of professional ethics as it relates to data ownership, intellectual property, and software piracy. These are critical issues that will become even larger as the amount of and access to information proliferates.

Software Piracy. With the widespread use of personal computers, thousands of software packages have been developed. These programs are commonly stored on floppy diskettes and can range in price from a few dollars to well over $600. A serious problem facing the personal computer software industry is what is called software piracy--the illegal duplication of software. It has been estimated that for every one software package sold, four are made illegally. The losses to software manufacturers are running in the hundreds of millions of dollars. An important question and consideration for software developers is how to protect software from being copied illegally. As mentioned above, the development of firmware program chips may help to alleviate this problem.

The primary laws used to protect software are federal copyright laws. Most computer software is protected by copyright laws. To the user this means that making copies of programs and sharing them with friends and co-workers is a violation of federal law. An article from the March-April 1988 issue of Words is included in the "References" section for your information. It covers a wide variety of the legal ramifications of computer law.

The important points to be emphasized are: it is NEVER all right to make copies for friends, neighbors, or co-workers; an organization should purchase enough copies of software for its use or acquire a license or site agreement; schools are not exempt from federal laws. Teachers should be a role model for students.

Read the license agreement on the software package which buyers tacitly accept when they open the package for the first time. (An example of a license agreement is included in the "References" section.) Users should understand that software manufacturers are not selling the software to buyers. The agreement explicitly states that software manufacturers are licensing the buyer to use the software on only one computer at a time. Therefore, if an individual uses the software on two different machines at the same time, the software license has been violated.

Society is becoming increasingly concerned with the ethics of the information processing profession and with the relationship between ethical behavior and criminal behavior with respect to access to information. Many companies are developing policy statements regarding hardware, software, and information ownership. This issue is not going away and must be dealt with by organizations. Management must make it perfectly clear to employees what is considered to be ethical and unethical behavior. An example of a policy statement is included in the "References" section to share with students.

Federal and state laws are also in place to discourage "hackers" with unauthorized clearance from breaking into private or public data banks using remote terminals by breaking security codes and passwords. Computer crime, as this is called, will continue to receive more attention and more litigation in the future.

Included in the "Student Materials" section is Exercise 2-1 entitled, Attitude Test Regarding Ethics of Information Processing. Ask students to take the test and be able to justify each answer. The purpose of this exercise is to create students' awareness of the issues of ethics, criminal behavior, and their responsibility in these issues.

SKILLS FOR INFORMATION MANAGEMENT

The evolution to integrated office systems not only will be economically feasible but highly desirable to all levels of workers as electronic storage and retrieval processes combine to encompass office technology. An integrated office structure will include electronic mail and voice messaging systems; local and wide area networks utilizing telephone, microwave, or satellite transmission media; desktop computer configurations referred to as workstations, as well as mainframes and minicomputers; sophisticated word and information processing software; advanced reprographic systems, including intelligent copiers and printers; optics; and desktop management software. New positions, as well as new skill requirements for new and old positions, will evolve. These skill areas include technological, business, management, communications, and interpersonal. Each of these areas is discussed below.

Technological Skills

Already it has been alluded to that as the organization changes so will the skills for the information worker. It goes without saying that technical skills related to the ability to access, process, manipulate, and distribute information are critical. Part of the technological knowledge which workers must possess includes operational knowledge of a wide variety of software and hardware; understanding of the information processing cycle; knowledge of office procedures, terminology, and services; and acceptance of change.

The magnitude of the changes fomented by the proliferation of electronic equipment is illustrated in a report from the International Data Corporation (Predicasts Datebook, 1983) which states that sales to business and industry of computers and auxiliary equipment rose from $3.1 billion in 1967 to $36.5 billion in 1983, representing an average annual rate of nearly 17 percent. The IDC report (1983) goes on to state

> that by the end of 1983 there were about 18.5 million electronic keyboard devices (PC's, other computers, terminals, and word processors) in use, or about one for every three of the 55 million white collar workers. By 1987, they forecasted 54 million electronic keyboard devices, or virtually one for every white collar worker. They further forecasted an installed base of about 19 million PC's in the U.S. business/professional market by 1987, or about two PC's for every three managers and professional workers.

Experts forecasted that at this rate of market penetration, by 1990 virtually all white-collar workers in the United States would be working with electronic keyboards; and most, if not all, nonclerical white-collar employees would be working regularly with a PC or electronic workstation. Further, by 1995, every manager, professional/technical worker, and office salesperson will be working with an electronic workstation. Keyboarding may become a necessity for persons at all levels of the organization.

A recent study of office systems consultants, office administration faculty, and other collegiate business faculty focused on the importance of concepts needed by managerial personnel in automated offices. The concepts which were rated as required or essential were found in the areas of integrated office systems, communications and distribution, and filing and records management. The essential or required competencies cover a wide range of technological skills, including the use of:

> ...dictating machines...visual display text editors...electronic keyboard typewriters... computer graphics...magnetic media storage... computer-assisted retrieval... electronic mail systems... facsimile...teleconferencing...

> executive workstations...distributed logic...decision support systems...and administrative secretarial support workstations...

Many other studies in this area have come up with the same findings.

Advances in electronic communication technology are changing many of the traditional ways communication takes place in the office. Changes are occurring in electronic mail; electronic publishing; telecommunications; interactive television; electronic encyclopedias, thesauruses, outliners, spelling checkers, and English syntax style analyzers; networking; speech recognition systems, cordless, high-tech, and cellular telephones; high speed and portable facsimiles; teleconferencing; and microwave-linked offices. Hands-on experience in all of these areas is not necessary, but heightened awareness and conceptual knowledge is.

(Note to instructor: The point should be made that how well users embrace new technologies and procedures will determine how well the transition is made from school to work. Specific activities in which students could engage include: practice in planning and designing an office, demonstrate electronic calendar software, compare and evaluate hardware and software, locate and compare vendors for particular hardware and software, visit an electronic print shop, practice in composing on electronic equipment (and at the same time making decisions on formatting and revisions), collect business information from which to prepare and write a report with accompanying graphics, research records and storage systems, and study concepts, terminology, and systems used in telecommunications.)

Business Skills

Employees at all levels of the organization must be familiar with the mission of the organization and its products and services. The mission, goals, and values of an organization, the nature of the business, and the nature of the work and the context in which it is performed provide the conceptual framework into which information systems will converge in an organization. The rate with which technology is changing requires that a successful organizational framework be open, adaptable, and amenable to change.

In general, people in organizations respond differently to technology. However, organizations need to have mechanisms in place to reward those individuals who interact creatively with their systems, who make good decisions, and who remain flexible in accepting change. Dealing with change (more precisely, the rate of change) and its effects on work and people will be one of the most important skills information systems workers can acquire.

Today's organization is no longer a classic, multi-level pyramid. It is becoming less hierarchical, flatter, richer, faster, more precise, more innovative, more information dependent, more responsible, and more interconnected. This trend becomes more complex as middle levels of management are compressed and squeezed and the demand for clerical workers with technological skills rises. Increasingly, key decisions are being made by those who can most efficiently input, store, retrieve, and disseminate information.

Management Skills

The ability to plan, organize, direct people or functions, and control has been recognized as the purview of management. If, as Drucker has written, the information-based organization is characterized by a span of communications, the ability to access and obtain information will make all employees responsible for setting objectives, controlling, and managing their tasks in harmony with others. Several studies related to office automation skills have supported the value of management skills for office employees. Problem solving and decision making, as well as organizing and scheduling skills, are among the most important skills needed by office employees. With technological equipment taking over much of the repetitive work in the office, tasks no longer are routine but involve decision making and problem solving skills that are used in the design and coordination of a system of people, procedures, and equipment.

Many experts have recognized that a flatter organization requires workers to be self disciplined, be able to ask questions, be able to set goals and objectives, be flexible, be able to make fast decisions and quick responses, and be able to accept responsibility--many of the skills that managers have needed in the past.

Communications Skills

Even with the use of sophisticated communications software in the automated office, the ability to relate and communicate effectively with all levels of employees is not likely to diminish. The requisite communication skills are broad-based and include the gamut of verbal, nonverbal, and written skills. Communication is still considered the number one priority competency for office employees.

Employees in the automated office must pay attention to the communication skills of reading; basic English; writing letters, memos, and reports; proofreading; and preparing and making oral presentations. Even though computer programs are available to check spelling, grammar, and punctuation, there is no substitute for an efficient, effective proofreader.

Personal traits and good communication skills are the very skills that never can be replaced by computers, software, and other technological developments. Computers can never develop interpersonal relations and gain understanding through nonverbal cues. A solid combination of technological skills and human relations skills will become essential in the automated office.

Interpersonal Skills

Human relations involve the mechanisms inside and outside the organization (structural, interactive, managerial, and procedural) which provide for social contact between persons. This interaction of all levels of employees in the integrated office will require critical attention as technology continues to pervade the office and threatens traditional working relationships.

"People skills" still remain critical to employees' success in the changing office. These human relations skills include goal setting, personal appearance, good self concept, communications, listening, ability to cope with criticism, decision making, teamwork, and handling conflict. The rationale for these skills is that increased opportunities to participate in management have imposed greater expectations on employees.

Today's business employee must solve problems in the workplace, develop new competencies, and produce in a very competitive atmosphere. Human relations are so critical that more workers lose their jobs because of their inability to get along with fellow workers than for any other reason. Employers have stated that some of the things they look for are cooperative attitudes, enthusiasm, practical expectations, and punctuality.

Specific human relations skills and personal traits for information workers include discretion in confidential matters; demonstrated interest in their work; acceptance of responsibility; exhibited flexibility, versatility, and leadership; demonstrated initiative, imagination, autonomy, and creativity; acceptance of constructive criticism; following oral and written instructions; willingness to work under pressure; exhibited honesty and loyalty; working effectively with people; care in matters of dress; adaptation to change; acceptance of challenges presented by new office equipment and procedures; continued learning and developing professionally; and demonstrated good judgment.

While it is meaningful to know what skills are important from supervisors' points of view, it is equally as enlightening to know what office workers expect from their work. Employees of the next decade will be qualitatively different from employees of the past, with the differences being in education and skill levels, age distribution, and values. Workers who are more educated feel more powerful; they are interested in growth and development on the job. If growth and development are not available in one position, workers feel strong enough to move to other positions or fields. The desire of these employees for new ways of working show that they are creative, flexible, innovative and proactive--just the employee traits organizations need to cultivate to be responsive to their environment.

Human concerns

The office is composed of people who work together toward common goals and objectives. It is imperative that the skills for working with people and the expectations of workers are satisfied in order to successfully achieve these goals and objectives.

The recent history of integrated office systems has shown that the rush to increase efficiency and productivity has resulted in the lack of appreciation for the "people issues" related to acceptance of new technology. These are "technology-driven" concerns. When people in the organization have arrived to find microcomputers at their desks, the natural inclination has been to resist change. A very well thought out office automation strategy which takes into account the benefits to the people, as well as to the work of the organization, will go a long way toward enhancing the socio-technical environment.

The human side is the most important aspect in any consideration of jobs and organizations. It must be considered simultaneously to the technical and production requirements of the work. When information technology reorganizes work and procedures, new patterns of communication and interaction are possible. In a dynamic work environment, the social network is an important buffer between the worker and other elements (especially the computer terminal) in the work place. In the automated environment, there is a tendency for the worker to spend greater portions of the day interacting with a computer. A report from the Office of Technology Assessment (1985) states about the emerging office environment:

> There will be more need for lounges and discussion rooms and the like, to break the routine of stress from the machines. As tasks become more mechanical and isolating, more group activities and worker clubs and incentive systems need to be developed to keep up team spirit and morale.

Decades of research have established the importance of social communities in the work place and the lengths to which people will go to establish and maintain them. The human resource in an organization is the pivotal ingredient on which the success of the automated office hinges.

Naisbitt (Megatrends, 1980) has called this concept "high tech/high touch". That is, whenever new technology is introduced into the environment there is a counterbalancing human response of high touch. Without the high touch, the concept is rejected; and the more high tech, the more high touch.

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Summary. Office technology is developing at a rapid rate, forcing office workers to keep pace or face the danger of becoming outdated. The nature of the automated office itself is undergoing change which holds the potential for better information management, communications, and decision making along with increased job satisfaction, quality of work life, and opportunities for growth.

(Note to instructor: A study guide for students is included in the "Student Materials" section as Exercise 1-1. A suggested evaluation instrument is included in the "Evaluation" section as Test 1.)

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(A complete list of references is included in the **"References"** section.)

APPLIED INFORMATION SYSTEMS

Task Area 2

Given specific problem/challenge situations for the automated office, the student will be able to recognize, discuss, and research proposed solutions and/or compromises for the problem/challenge situations to the satisfaction of the instructor.

At the rate at which technology is changing the work patterns and work flow in the automated office, information workers must be able to recognize and deal with issues, problems, and concerns which are encountered.

Suggested teaching strategies: Introductory material lecture, outside readings, and assignment of topics for research by students.

The proliferation of computers, software, and peripherals is having a profound effect on the integration of information systems in the automated office. The sheer numbers of commercial manufacturers of computers, software, printers, disk drives, and other related equipment is staggering. This does not take into account the many private developers who offer public domain software, clones of various products, and new companies which seem to be emerging on a daily basis. Many issues have been raised regarding decisions, values, ethics, people, work, change, location of work, integration, systems design, and job and career opportunities.

While computers are becoming more powerful, versatile, and easier to use, many organizations are experiencing difficulties and challenges in several areas, notably:

a) integration of systems including expansion and upgrading,
b) training of all levels of employees by vendors and information resource professionals including time and cost,
c) productivity of employees and organization,
d) changes in organizational structures,
e) career paths for support professionals,
f) need for policies related to security, ethics, and values as they relate to information management,
g) procedures for utilizing and implementing office technology, and
h) coping with change brought about by office technology to procedures and systems and the effects of change on people.

This is not an exhaustive list of issues which are facing society and the automated office due to computerization; it is not intended to be. As with any new technology, new and evolving situations always are emerging.

The purpose of this task area is to create an awareness of problem/challenge areas which will be encountered in the automated office and to expose students to opportunities to research proposed solutions to resolve (insofar as possible) the situations. Each of the challenge areas listed above is discussed in the following paragraphs. Suggested questions for discussion and areas of research are covered in each section. In-depth coverage of each area is purposely avoided so that students can contribute meaningfully to the subject area with their own research and proposed solutions. Focus on the most current literature will ensure up-to-date data. A list of suggested periodicals and other resources is included at the end of this task area.

INTEGRATION OF SYSTEMS

The value of the separate information processing systems (word processing, data processing, and communications) in the automated office rests on being able to integrate them to increase efficiency and productivity and to enhance and enable decision making. Issues have arisen in trying to accomplish this. Each of these issues, as well as other issues related to the automated office, has been mentioned in information systems literature and should be researched and reported on by students:

1. Compatibility of hardware, software, media, and telecommunications is important. Many vendors and manufacturers "promise" compatibility between their systems and existing systems within an office even if there are different operating systems on the computers.

   One type of magnetic media may not work on another system. When this occurs, media conversion services or equipment and software may have to be purchased.

   WHY ARE THESE SYSTEMS NOT COMPATIBLE AND WHAT CAN BE DONE ABOUT IT? HOW DOES THE PURCHASER ENSURE COMPATIBILITY BETWEEN SYSTEMS? WHAT HAVE COMPANIES DONE TO ENSURE COMPATIBILITY?

2. Connectibility or connectivity of various network and communication systems is important. The area of telecommunications is expanding at a rapid rate. In order for telecommunications to take place between

users, compatibility must exist between speed, codes, transmission modes, and protocols. The biggest obstacle lies with different codes to transmit data, text, voice, etc. (ASCII vs EBCDIC vs others).

There is a clear distinction between equipment that is capable of communications and equipment that actually _is_ connectible. Many systems can receive information that is sent but without formatting codes. What are the distinctions? In many cases, it is _caveat emptor_.

WHY IS IT NECESSARY FOR TRANSMISSION CODES TO BE COMPATIBLE? WHAT SOFTWARE AND HARDWARE MUST BE ACQUIRED INITIALLY TO PROVIDE THIS CAPABILITY WITHIN AN ORGANIZATION? WHAT ARE SOME OF THE PROBLEMS ASSOCIATED WITH PROVIDING THIS CAPABILITY WITHIN AN EXISTING SYSTEM? WHAT IS THE "TRUE" MEANING OF CONNECTIVITY/CONNECTIBILITY?

3. Editability of documents between computer systems may be crucial to an organization. Experts agree that there can be no "true" connectibility unless documents can be received with formatting codes imbedded in documents as they are transferred from the sender. In this way, documents can be edited, manipulated, and processed for final distribution and save rekeying time.

   WHAT IS THE VALUE OF RECEIVING FORMATTING CODES AS SENT? WHY DOES THIS ENHANCE EDITABILITY?

4. Expansion and upgradability are central to the purchase of office systems.

   HOW? WHY? HOW DOES THE PURCHASER BUILD EXPANDABILITY AND UPGRADABILITY INTO OFFICE SYSTEMS PURCHASES?

5. Many experts feel that the lack of compatibility between applications software packages points out a need for standardization in software rules which permits communication among various brands of computers. The literature mentions two organizations which have been formed to develop standards: In 1986, the Corporation for Open Systems was established by several computer manufacturers to create a set of software rules to promote compatibility. The second organization, International Standards Organization (ISO) located in Geneva, already has agreed to a model for common formats. This model seems so generic that communications has not yet been realized.

WHAT IS MEANT BY "STANDARDIZATION"? WHO SHOULD SET THE STANDARDS? WHY IS IT IMPORTANT FOR AN ORGANIZATION TO HAVE OFFICE SYSTEMS STANDARDS? WHAT DO THESE TWO ORGANIZATIONS NEED TO DO TO PREPARE MANUFACTURERS TO ACCEPT STANDARDIZATION OF SOFTWARE? IS IT PRACTICAL? IS IT POSSIBLE?

6. Safety issues also have arisen. Companies need to safeguard against computer malfunctions, software error codes, and viruses--all of which may result in loss of data critical to a company's future ability to compete.

   WHAT IS BEING DONE BY SOME COMPANIES TO GUARD AGAINST COMPUTER AND DISK CRASHES? SOFTWARE GLITCHES? CREEPING VIRUSES WHICH MAY COME FROM PUBLIC SOFTWARE?

7. Look to the future for the development of hardware that is faster, is more powerful, has more depth, has more functions, has more workstation level functionality, and has more available and sophisticated software.

   SPECIFICALLY, WHAT ARE THE FUTURE TRENDS IN HARDWARE, SOFTWARE, MICROCHIPS AS FIRMWARE AND STORAGE DEVICES, WORKSTATIONS, PARALLEL COMPUTING, DISTRIBUTED DATA PROCESSING, INPUT/OUTPUT/STORAGE TECHNOLOGIES, NETWORKS, TELECOMMUNICATIONS, ROBOTICS, ARTIFICIAL INTELLIGENCE, ETC.? HOW WILL THESE TRENDS AFFECT THE SUPPORT PROFESSIONAL'S JOB AND JOB REQUIREMENTS? FROM YOUR READING, WHAT SPECIFIC CHANGES IN WORK PROCEDURES MAY RESULT FROM FUTURE TECHNOLOGIES?

   SUMMARY QUESTIONS: WHAT WILL THE FUTURE HOLD AS IT RELATES TO SAFEGUARDING DATA, MAKING SOFTWARE COMPATIBLE, ESTABLISHING STANDARDS FOR COMMUNICATING BETWEEN COMPUTER SYSTEMS, AND CONNECTIBILITY OF COMPUTER SYSTEMS?

TRAINING

Training of all levels of employees by vendors and information resource professionals is a big investment in time and cost. Training has become an issue in the automated office. In the short history of the integrated office, many experts feel that training has been aimed only at the support professional and has ignored the staff, professional, and managerial levels. What this has done is create a level of employee that is very good at manipulating equipment and creating new uses for technology but may not be able to communicate, work with people, think, solve problems, and make decisions.

On another level, if more improved information access is a prime goal of an organization, then every employee should know how to use his/her workstation and its components. This means that professionals, managers, and executives should be trained in the use of automated equipment.

Another issue related to training is the lack of appropriate vendor training which addresses the specific needs of the purchaser's organization. Experts state that vendors offer generic programs--the same thing for everyone. No standards have been established to provide uniform training packages or to ensure levels of proficiency in office technology training. Most vendor training is seen as "hit and miss" at best.

WHAT KINDS OF TRAINING DO SUPPORT PROFESSIONALS NEED? WHAT KINDS OF SKILLS ARE GOING TO BE REQUIRED OF THE SUPPORT PROFESSIONAL IN THE AUTOMATED OFFICE? WHO SHOULD TRAIN THEM?

WHY SHOULD STAFF, PROFESSIONAL, AND MANAGERIAL EMPLOYEES RECEIVE TRAINING ON EQUIPMENT? WHAT KINDS OF TRAINING SHOULD EXECUTIVE/MANAGERIAL EMPLOYEES RECEIVE AND HOW SHOULD THE TRAINING BE DELIVERED? WHO SHOULD TRAIN THEM?

WHAT CAN VENDORS DO TO IMPROVE TRAINING SO THAT IT IS MORE IN LINE WITH THE NEEDS OF INDIVIDUAL ORGANIZATIONS?

PRODUCTIVITY OF EMPLOYEES AND ORGANIZATIONS

Increased productivity is the prime consideration in the automation of the office. Some experts feel that productivity has been sacrificed for increased efficiency because of the potential for alienation of people, isolation, stifling of creativity, job fragmentation, dehumanization of communications, regimentation, and monitoring of electronic communications brought about by office automation. These issues relate directly to the effects of automation on people. These experts feel that if automation is handled as it should be, people will be the prime consideration and productivity will be greatly enhanced. A "science" that is emerging from this argument is called socio-technical analysis. Briefly, this analysis points out that the key to effective office automation is to consider the user environment before approaching the technical requirements.

There are experts who from the beginning would argue that automation, which was aimed at the support professional, has lived up to the promise of increased productivity. These experts feel that support professionals have been freed from many boring, repetitive tasks which can be handled better by machines leaving the people free to learn other skills, handle more important work, and become better employees. These same experts feel that the division of labor--administrative work versus correspondence work--has given management a better understanding of the work of the support professional and careers, promotions, and compensation can be developed accordingly.

Still a third group of experts feels that the productivity of an organization can be enhanced only by putting automated tools in the hands of professionals, managers, and executives as well as support professionals. When the productivity of these individuals is increased, the whole organization will show gains in productivity.

HAS THE PROMISE OF INCREASED PRODUCTIVITY IN THE AUTOMATED OFFICE LIVED UP TO ITS BILLING? WHAT DO OTHER EXPERTS SAY ABOUT PRODUCTIVITY IN THE OFFICE WITH INTEGRATED SYSTEMS? IN A WAY, AREN'T ALL OF THESE EXPERTS RIGHT IN THEIR POINTS OF VIEW? READ AND REPORT ON SOCIO-TECHNICAL ANALYSIS. WHAT IS ITS VALUE TO THE AUTOMATED OFFICE?

CHANGES IN ORGANIZATIONAL STRUCTURES

Task Area 1 has put forth the scenarios for changes which are or will be occurring in the organizational structures due to office automation. Peter Drucker has written about the change to a "span of communications" from the traditional "span of control" which will result in a flatter organization. Access to information, the capability of turning information into knowledge, and the ability to communicate the information and knowledge to all levels of the organization will blur the traditional lines of control.

Another author has stated that computers are leading to the elimination of mid-level managers and this is resulting in a flatter organization. The pencil-pushing, detailed manipulation of information traditionally accomplished at this level of the organization is disappearing into the mainframes and microcomputers. With this level of management disappearing from organization charts, it is anticipated that many of the skills and duties of mid-level management will be absorbed by the support professionals.

Another form of organizational structure mentioned in the literature is the matrix. The matrix organization structure (which is not new to organizational management) employs the creation of work teams which come together to work on various projects. When the project is completed, the members of the work team are absorbed back into their original departments. This kind of organizational structure may not be considered flatter but it is more fluid.

Calvin Pava (Managing New Office Technology) introduces the idea of the reticular organization. Drucker and Pava are close together in their description of an organization which is based on the manipulation of information into usable knowledge, taking the information from any level of employee within the organization. Both of these management writers value the creation of reporting relationships based on who has what information, who needs that information, and the resulting collaborations from using and manipulating the information.

Quality of Work Life (QWL) is not an organizational structure in itself but it is receiving a lot of attention in office automation literature. It is a program designed to encourage greater worker involvement and a more democratic atmosphere in which workers are encouraged to have a voice in the structure of their jobs. Many facets of QWL can be seen in job enrichment programs, job enlargement activities, flexitime, compressed work weeks, and job sharing. All of these facets focus on the individual's having more control of and concern for the job, their job responsibilities, and the organization. Don Tapscott (Office Automation: A User-Driven Method) feels that QWL offers the greatest hope for the implementation of office systems because of its focus on people and the socio-technical aspects of technology.

One organizational pattern which has not been discussed and bears mentioning is telecommuting: working at geographically-independent locations such as home, offshore, or in centrally located work centers. Telecommuting also may be viewed as another aspect of QWL programs.

Kleinschrod (Approaching the Automated Office) passes on the following information from John Diebold about telecommuting:

> ...this could lead to widespread decentralization of many office functions. People previously unable to travel--the handicapped, or parents with small children--represent an enormous untapped human resource that might easily "telecommute" to become part of an office workforce. For others, the home office will be a matter of

deliberate choice.

Kleinschrod points out that workers seem to know about telecommuting and consider it feasible for a while but they say "you better soon get back into the communicational swing of things at the office or quickly lose touch with what is going on." He suggests that one compromise between home and the office is the satellite work center which he describes as "an intelligent facility perhaps shared with other companies".

The Office of Technology Assessment (Automation of America's Offices: 1985-2000) cautions that there are legal questions to be resolved regarding "farming" out office work to homes, as well as wage and salary questions. The whole aspect of telecommuting, however, sheds a different light on organizational staffing and procedural patterns.

It seems from the above presentation that many of these approaches are focusing on people.

WHY IS THIS? WHY IS CONCERN FOR THE EFFECTS OF AUTOMATION ON PEOPLE JUST NOW BECOMING SO IMPORTANT? WHAT OTHER ORGANIZATIONAL STRUCTURES MIGHT BE POSSIBLE IN THE AUTOMATED OFFICE? WHAT DO DRUCKER, PAVA, TAPSCOTT, AND OTHERS HAVE TO SAY ABOUT ORGANIZATIONAL STRUCTURES? WHAT ASPECTS OF THE QUALITY OF WORK LIFE MOVEMENT APPEAL TO YOU THE MOST? GIVEN YOUR UNDERSTANDING OF TODAY'S AUTOMATED OFFICE, ARE THEY PRACTICAL AND POSSIBLE?

CAREER PATHS FOR SUPPORT PROFESSIONALS

Due to office automation, specific careers and careers paths have been opened up to the support professional. These careers fall into the following categories: administrative services, training, marketing and sales of equipment, technical writing, equipment operation, consulting, supervision, coordination, quality control, and others.

WHAT KINDS OF CAREERS CAN BE FOUND IN EACH OF THE CATEGORIES MENTIONED ABOVE? WHICH ONES APPEAL TO YOU AND WHY? WHAT ARE THE COMMON FACTORS OF (A) THE CAREERS YOU SELECTED AND (B) THE CAREERS YOU DID NOT SELECT? READ THE WANT-ADS IN THE SUNDAY NEWSPAPER TO FIND JOBS WHICH ARE AVAILABLE IN YOUR AREA IN THESE CATEGORIES. WHAT CAREER AREAS WILL OPEN UP IN THE FUTURE?

NEED FOR POLICIES RELATED TO SECURITY, ETHICS, AND VALUES AS THEY RELATE TO INFORMATION MANAGEMENT

A major consideration in evaluating office systems (which include workstations, networks, or other systems) is the amount of protection provided from accidents and from criminal tampering. Accidents occur from several sources: user error, user ignorance, power outages, and lack of provision for back-up copies due to a disk "crash". Some software actually holds deleted files in a temporary storage buffer which can be brought back with a special command. Some software asks for confirmation before deleting files. Safeguards are needed against changing data in a central record. One method is to provide read-only access to central data so that users can see and work with information on their microcomputers but cannot change the central record.

One protection against criminal activity may be to install passwords whereby users are required to log on. Another technique is encryption where data are scrambled by a special program and then unscrambled only for users who enter the required codes. Many programs also provide audit trails which show exactly what was done to a file, when it was done, and which password was used to gain access to the file. In this way, sabotage or errors can be traced to the origin and preventive measures taken, if needed.

A serious problem facing the personal computer software industry is what is called software piracy--the illegal duplication of software. It has been estimated that for every one software package sold, four are made illegally. The losses to software manufacturers are running in the hundreds of millions of dollars. An important question and consideration for software developers is how to protect software from being copied illegally. The development of firmware program chips may help to alleviate this problem.

The primary laws used to protect software are federal copyright laws. To the user this means that making copies of programs and sharing them with friends and co-workers is a violation of federal law. It is NEVER all right to make copies for friends, neighbors, or co-workers. An organization should purchase enough copies of software for its use or acquire a license or site agreement.

When purchasing software, the user should read the license agreement on the software package which buyers tacitly accept when they open the package for the first time. The agreement explicitly states that software manufacturers are licensing the buyer to use the software on only one computer at a time. Therefore, if an individual uses the software on two different machines at the same time, the software license has been violated.

Society is becoming increasingly concerned with the ethics of the information processing profession and with the relationship between ethical behavior and criminal behavior with respect to access to information. Many companies are developing policy statements regarding hardware, software, and information ownership. This issue is not going away and must be dealt with by organizations. Management must make it perfectly clear to employees what it considers to be ethical and unethical behavior related to information access and information management.

Federal and state laws are also in place to discourage "hackers" with unauthorized clearance from breaking into private or public data banks using remote terminals to break security codes and passwords. Computer crime, as this is called, will continue to receive more attention and more litigation in the future.

READ AT LEAST ONE ARTICLE RELATED TO EACH OF THE FOLLOWING: (1) MEANS OF ESTABLISHING SECURITY OF INFORMATION AND FACILITIES, (2) THE ISSUES OF SOFTWARE PIRACY AND POSSIBLE FUTURE SOLUTIONS, (3) ASPECTS OF COMPUTER LAW, (4) ETHICS OF HANDLING PRIVATE INFORMATION, AND (5) REPORTS OF COMPUTER CRIMES. BE PREPARED TO DISCUSS YOUR ARTICLES.

PROCEDURES FOR UTILIZING AND IMPLEMENTING OFFICE TECHNOLOGY

Evolving with the changes to the organizational structure must be strategies to enhance the success of the technical and social subsystems. These strategies will directly involve managers as well as support professionals to accomplish a particular job in the correct sequence. Tapscott (Office Automation: A User-Driven Method) states that hardware (tools) and software (including media) must be integrated over time with what he terms orgware which he describes as follows:

> ...Orgware consists of the procedures, workflow, job redesign, training strategies, implementation plan, educational activities, system responsibilities, and so on which optimize the social component of the new work system.

WHAT KINDS OF SPECIFIC CHANGES HAVE OCCURRED IN OFFICE PROCEDURES, WORK FLOW, JOB STRUCTURES, AND REPORTING RELATIONSHIPS DUE TO OFFICE AUTOMATION? HAVE THESE CHANGES

BEEN GOOD OR BAD? WHAT CHANGES WILL OCCUR IN THE FUTURE?

COPING WITH CHANGE

All of the issues mentioned above could be directly related to coping with changes brought about by office automation. In fact, as Wagoner and Ruprecht (Office Automation: A Management Approach) say: "The automated office is not a destination but a journey." In other words, it is always in a state of flux, always changing.

Technostress has received some publicity in the literature related to the automated office. What is technostress? How does stress play a part in coping with office technology?

WHAT SOLUTIONS ARE OFFERED IN THE LITERATURE FOR COPING WITH CHANGE? WHAT IS THE PROPER WAY TO APPROACH THESE CHANGES? WHAT IS THE MOST EFFECTIVE WAY FOR INTRODUCING OFFICE AUTOMATION TO THE OFFICE?

SUMMARY: The purpose of this task area is to promote and encourage as much discussion as possible related to issues, challenges, problems, and concerns related to office automation and information systems technology. The issues discussed briefly above may only be the tip of the iceberg. It is critical that students develop the ability to recognize, discuss, research, and develop possible solutions in these areas. Along with flexibility, it will be essential for support professionals to stay up-to-date with the latest terminology, vocabulary, concepts, issues, and emerging technologies for the automated office. Other questions and issues relating to change must be addressed as they come up.

APPLIED INFORMATION SYSTEMS

Suggested resources include but should not be limited to the following resources:

Periodicals

ACCESS
ADMINISTRATIVE MANAGEMENT (formerly OFFICE ADMINISTRATION AND AUTOMATION)
ARMA RECORDS MANAGEMENT QUARTERLY

BUSINESS COMPUTER DIGEST
BUSINESS WEEK
BYTE

COMPUTER DECISIONS
COMPUTER WORLD, including their Office automation and Telecommunications issues

DATA COMMUNICATIONS
DATAMATION
DATAPRO REPORTS (available for a number of areas in Office Automation, including Automated Office Solutions, Office systems, Word Processing, Copiers and Duplications, Small Computers, Microcomputer Software, and Telecommunications)

FORBES (excellent source for International Data Corporation white papers written several times a year as an advertisement supplement)
FORTUNE (excellent source for International Data Corporation white papers written several times a year as an advertisement supplement)

GRAPHICS ARTS MONTHLY

HIGH TECHNOLOGY

IMPACT
INDUSTRY WEEK (also an excellent source for International Data Corporation white papers written several times a year as an advertisement supplement)
INFORMATION MANAGEMENT
INFOSYSTEMS
INFOWORLD
INTERFACE AGE

MANAGEMENT REVIEW
MANAGEMENT TECHNOLOGY
MANAGEMENT WORLD
MIS WEEK
MODERN OFFICE TECHNOLOGY (formerly MODERN OFFICE PROCEDURES)

THE OFFICE

PC WEEK
PC WORLD

THE SEYBOLD REPORT ON OFFICE SYSTEMS

TECHNOLOGY IN FOCUS
TODAY'S OFFICE
TRAINING
TYPEWORLD

WORDS

BOOKS AND MONOGRAPHS

APPROACHING THE AUTOMATED OFFICE, Walter S. Kleinschrod, 1987-88.
(Based on a series of four monographs developed from a grant by Olsten Corporation to the AMS Foundation: This monograph and the other four are available from the Administrative Management Society Foundation, 2360 Maryland Road, Willow Grove, PA 19090).

AUTOMATION OF AMERICA'S OFFICES: 1985-2000. U. S. Congress, Office of Technology Assessment, Washington, D. C., U. S. Government Printing Office, OTA-CIT-287, December 1985.

MANAGING NEW OFFICE TECHNOLOGY: Calvin H. P. Pava, 1983.

MEGATRENDS, John Naisbitt (continues to be quoted)

OFFICE AUTOMATION: A USER-DRIVE METHOD, Don Tapscott, 1982.
(Tapscott is considered one of the leading authorities in office automation at the present time.)

THE THIRD WAVE, Alvin Toffler (continues to be quoted)

APPLIED INFORMATION SYSTEMS

Task Area 3

Given a specific problem situation within the automated office, the student will be able to

> **1) define the problem, (2) use the problem solving steps: collect data, involve the right people in the process, analyze the facts, develop possible solutions, select alternatives, make the decision, and evaluate the solution and decision; and (3) practice using the problem solving and decision making processes as they relate to problems in information systems to the satisfaction of the instructor.**

Suggested teaching strategies: Discuss processes and styles of solving problems as a group. Divide into groups for practice in solving problems.

Automated equipment is affecting the speed, quality, and quantity of the decisions to be made, as well as the types of problems to be solved. Many of these problems and decisions are affected by the interrelatedness of the systems in an organization--administrative, human, social, financial, managerial, sales, legal, economic, ethical, political, educational, production, purchasing, accounting, and environmental. Yet, the techniques and procedures used to implement effective decision making and problem solving remain constant.

Problem solving has been identified as one of the most important skills that information systems workers can have. It is the key to effective decision making. Every employee is judged on his/her ability to solve problems. Businesses value good decision makers who can approach problems as challenges and offer appropriate solutions.

Most people are not born problem solvers or decision makers and have little practice in learning and applying problem solving and decision making techniques. Yet, they are expected to constantly make decisions in a variety of situations. Fortunately, problem solving and decision making skills lend themselves nicely to being acquired in the classroom.

This task area is concerned specifically with meeting the following objectives:

(1) Define the term, "problem".

(2) Outline steps in the problem solving/decision making process: get the facts, involve the right people in the process, analyze the facts, develop possible solutions, select alternatives, make the decision, and evaluate the process and the decision. Begin again with the next problem.

(3) List barriers to creative problem solving and decision making.

(4) Practice using problem solving and decision making processes as they relate to challenges in information systems.

FIRST OBJECTIVE: DEFINE THE PROBLEM.

Possible definitions include:

Webster defines "problem" in several ways: (1) "a question raised for inquiry, consideration, or solution", (2) "a proposition in mathematics or physics stating something to be done", (3) "an intricate unsettled question", and (4) "a source of perplexity, distress, or vexation".

Still others see a problem as either (1) something that is that shouldn't be (ex. absenteeism, tardiness, etc.) or (2) something that is not and should be (ex. productivity, sales quotas, etc.).

A problem also may be defined as a question (who, what, when, where, how, and why), or a deviation between the known and the unknown (old productivity figures with old system vs new productivity figures with new system) or between that which is and that which is desired (knowledge of present automated system vs lack of knowledge of new automated system). This definition combines the elements of the two previous definitions and probably has application to our task here.

Note to instructor: In the next five minutes, ask the students in the class to name as many problems (challenges) as they can think of related to the automated office. This should be an easy task since assigned readings in the literature have presented many problems, challenges, and issues related to the automated office.

Write the problems on the chalkboard or overhead as students name them. Recognizing that a problem exists and being able to define it is the very first step in the problem solving process. Many times, a "problem well defined is half solved", as Kettering has said.

Now, categorize the problems: Into which category (question, deviation, known vs unknown, or desired vs undesired) do the problems fall which were listed on the board by the class? Discuss.

Possible responses may fall into any one of the categories discussed in Task Area 2:

a) integration of systems including expansion and upgrading,
b) training of all levels of employees by vendors and information resource professionals including time and cost,
c) productivity of employees and organization,
d) changes in organizational structures,
e) career paths for support professionals,
f) need for policies related to security, ethics, and values as they relate to information management,
g) procedures for utilizing and implementing office technology, and
h) coping with change brought about by office technology to procedures and systems and the effects of change on people.

Specific responses from students might include the following:

> lack of training on equipment and/or software, lack of vendor support, poor documentation for hardware and/or software, poor management of information and privacy, incompatibility of equipment, lack of consideration of people, unwillingness to change, inflexibility of employees and employers, lack of standards, lack of security on equipment and data, poor attitude, lack of motivation or incentives, no involvement from people who will be using hardware or software, unauthorized copying of software, etc.)

SECOND OBJECTIVE: OUTLINE THE STEPS IN THE PROBLEM SOLVING/DECISION MAKING PROCESS.

The next step in the problem solving process is to get all the data you can about the situation, the circumstances, and the possibilities no matter how wild. Brainstorm. No fact is irrelevant at this point. Ask questions of others, especially those who are affected by the problem and will be affected by the solution. INVOLVE THE RIGHT PEOPLE AT THE RIGHT TIME FOR THE SUCCESSFUL IMPLEMENTATION OF THE SOLUTION. No matter how good the solution turns out to be, it will be better if the people who are involved are included in the problem solving process AT THIS POINT--not after the problem is solved. Listen.

Next, analyze the information. Get rid of any preconceived ideas. Know your values and priorities and those of the organization. How important is this problem to be solved? Who should help solve it? Do I have enough information yet to solve the problem? Do I have the authority to solve this problem? List priorities and goals which affect the problem. KNOW THYSELF AND THY ORGANIZATION and the pressures and constraints under which the organization operates.

Then, develop possible solutions. The beginning of the decision making process enters into the problem solving process at this point. Create a list of possible solutions and rank order them. Consider the consequences of each solution. Role play the choices in your mind. Ask questions: What is the worst thing that could happen in each case? What is the best thing that could happen in each case? What is the ultimate goal? Does the solution fit with the values and priorities of the office, department, or organization? What are the costs? Is there a budget? What are the time constraints? Are there resources available and in place? What other problems will be created? This step is the test of the logical problem solver.

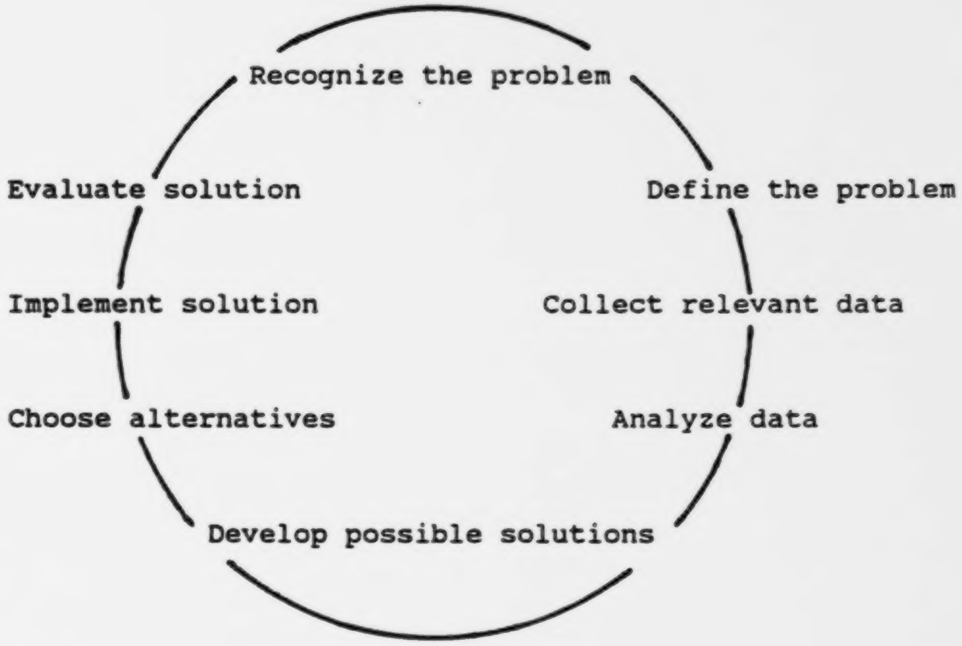
Out of all the possible solutions, choose the best alternative. Take the risk. Once the decision has been made, DO IT! Be prepared to take the responsibility for the decision. You've researched it, you've considered alternatives and consequences, and you've come up with what you consider to be the best possible course of action. Don't hesitate. Don't let someone else make the decision for you.

After the best solution (alternative) has been chosen, implement the solution. Be committed. Try your best to make the decision work, but be flexible. If necessary, change or modify it, and learn from it. Be realistically creative.

The very last thing is to evaluate the solution. Feedback and results will help you do this. Think about what your objectives were when you started out to make the decision. Match what was with what was accomplished. Did it solve this problem or did it create unforeseen problems?

Graphically, the problem solving/decision making process looks like this:

PROBLEM SOLVING/DECISION MAKING PROCESS


Recognize the problem
Define the problem
Collect relevant data
Analyze data
Develop possible solutions
Choose alternatives
Implement solution
Evaluate solution

THIRD OBJECTIVE: LIST BARRIERS TO CREATIVE PROBLEM SOLVING AND DECISION MAKING.

Barriers to effective problem solving and decision making arise from time to time and from many different sources. Probably the biggest barrier to creative thinking is the attitude of conformity developed in our society. Resisting change and conforming to the status quo stifle innovative ideas which are needed for good decision making and problem solving. Awareness of some of these barriers and the solutions to overcome them can aid in effective decision making. Ask students to name barriers; write them on the chalkboard or overhead as they are presented. The barriers might include:

Problem	Solution
the problems themselves	consider problems as opportunities or challenges, not as barriers
perceptions of what the true problem is	spend time needed to define it and explore alternatives; make decision. List at least three different solutions that might have been chosen. Many times perceptions change with the way the problem is viewed. Actually, there are usually several perfectly workable solutions for any one problem.
time, money, resources	adjust alternatives to accommodate resources; usually never enough of the right resources to implement the "perfect" solution. An effective problem solver and decision maker makes the most of what is available.

people	involve the persons affected in the solution at the beginning to avoid resistance to the solution; sell the solution by communicating effectively vertically and laterally; the attitude of the decision maker and problem solver goes a long way to creating or eliminating barriers. One management expert offers three suggestions: 1) strip away mistrusts and unnecessary regimentation in the work place; 2) encourage greater involvement of employees in their jobs; and 3) foster participation by employees in decision making processes.
environment (physical)	well-thought-out, researched solutions will go a long way toward solving most problems related to noise, lighting, ventilation, furniture, etc.
lack of problem solving strategies	find a problem solving strategy that works and USE IT! Practice!
lack of communication, lack of authority to solve problem or to make decision, no interest in solving problem, lack of freedom to act, etc.	many of these barriers are imposed by the climate of an organization. If the climate is not going to change, then perhaps the climate is not for you. However, climate can be changed!
Others as suggested by students.	

FOURTH OBJECTIVE: PRACTICE USING PROBLEM SOLVING/DECISION MAKING PROCESSES AS THEY RELATE TO CHALLENGES IN INFORMATION SYSTEMS.

(1) In order to PRACTICE the problem solving/decision making strategies, the following game is offered related to

office automation:

Divide the students into groups (or use the whole class as a group if it is small enough) to complete this exercise. You will need five index cards per person and one small envelope per person. Pass out the blank envelope and five index cards to each person. Ask each person to make his/her mark on the back of the envelope for identification purposes later in the game.

To the group(s) say:

> "On the front of the envelope, write a question or pose a problem from the list made by the class. After you have written your question or problem, pass the envelope to the person on your right.
>
> "Read the question or problem on the front of the envelope, write an answer or solution on an index card, and insert the card in the envelope. Here's your opportunity to be creative. After you have written your solution, pass the envelope to the right again. Without looking at the card in the envelope, the next person reads the question or problem, writes an answer or solution on an index card, inserts it into the envelope, and again, passes it to the person on the right. This process will continue until all index cards are completed."

After the process has been completed, ask the group(s) to place the envelopes face down in the center of the table and retrieve his/her/their own envelope (the reason for the identifying mark). Ask the students to read and prioritize the solutions (most preferred solution to least preferred solution). Read the questions or problems and the answers or solutions aloud.

Class discussion should center on the process as well as the products: How the problem was solved as well as what solution was suggested to the problem/challenge.

As an alternative, the following scenarios could be written on the envelopes that are handed to the students:

a. When vendors cannot provide the support that is needed on new automated equipment, what are the possible alternatives?

b. What kind(s) of training should be given to end users when new automated equipment is purchased? Who should do the training? Who are the users who should receive training?

c. What kind(s) of activities can be done by a department or an organization to include the support professionals in the selection and implementation of automated office equipment?

d. What kinds of procedures can be implemented to provide security of electronic data and automated facilities?

e. Make the case for standardized procedures in the automated office.

f. What can be done when the hardware and/or software documentation is poor?

g. What can you do as an information systems support professional to enhance change and foster acceptance of automated equipment?

h. Suggest at least one way to improve the productivity of file clerks with automated equipment.

(2) As further PRACTICE, assign the following problem for proposed answers or solutions in groups or as a class discussion. Use the questions related to the problem solving and decision making processes in this section:

> On several occasions during the three years you have made what you consider to be reasonable suggestions for improving procedures in your department. On each occasion, your department head has indicated that the idea has been tried before and did not work; consequently, it is assumed that it would not work now. OR Your department head has indicated that "upper management" was not willing to spend the money or provide other resources to implement your ideas. After thinking about the situation, you have come to the conclusion that since your department head did not think of the solutions himself/herself, he/she has not bothered to support them. You are sure that your suggestions would increase the effectiveness and efficiency of your department.
>
> Is there a problem? Define the problem.
> Analyze and collect data related to the problem.
> Develop possible solutions (at least three). Is the solution to this problem difficult? Why or why not?
> Choose the best alternative and implement it.
> Evaluate the results. What are the consequences of this problem if it is not solved?

One last point about problem solving and decision making: GO INTO THE DECISION MAKING AND PROBLEM SOLVING PROCESS WHILE IT'S HOT, BUT COOL IT BEFORE YOU ACTUALLY MAKE THE DECISION!

REVIEW QUESTIONS

1. What role does problem solving and decision making play in the management of organizations?

2. What role does problem solving and decision making play in the support professional's job?

3. Define "problem".

4. Identify two types of problems encountered in the support professional's job?

5. What kinds of knowledges should an effective problem solver and decision maker have about his/her organization?

6. Identify barriers to good problem solving and decision making. For each barrier, suggest a solution.

7. List the steps in creative problem solving and decision making.

8. Discuss this statement: "Defining a problem goes a long way toward solving it".

9. Are economic, human, and systems problems in the office separate from each other? Discuss.

10. Discuss your reaction to this comment: "Problem solving and decision making according to textbooks is unrealistic. Problem solving, when you get down to the nitty-gritty, is mainly a hunch and good intuition. It's having a 'feel' for the situation."

Selected References

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APPLIED INFORMATION SYSTEMS

Task Area 4

Given a variety of information systems problems, the student will be able to establish standards for formats to be used in written and oral reports (individually and in groups) and discuss the value of teamwork to the satisfaction of the instructor.

Suggested teaching strategies: Class discussions which focus on the standards and formats for oral and written reports and the value of teamwork. This task area sets the stage for the oral and written communications, project teamwork, and problem solving and decision making opportunities in Task Area 5.

To complete the intent of this section of the course, it is necessary to set up the standards for the written and oral reports of the case studies which will be presented in Task Area 5. The standards should be developed and agreed upon by the class as a whole. Also, class discussions should focus on the value of teamwork since the case studies in Task Area 5 should be used in project teams.

WRITTEN REPORTS

Review the acceptable formats and standards for written reports with the class. Since most of the reports involve internal communications, a memorandum format may be selected for the written report. Two memorandum formats are suggested as follows:

First Format

TO: **DATE:**

FROM: **SUBJECT:**

(Body of presentation)

Etc.

Second Format

Date

Instructor's Name
Address

SUBJECT

(Body of presentation)

Etc.

The content of the report may follow the format of reports which is acceptable in business and sometimes has been referred to as the Business Report Format. The report could include the following sections:

1) RECOMMENDATION: A one-sentence recommendation summary which states the overall conclusion, for example:

   > "Install a local area network in the word processing center."

2) EXECUTIVE SUMMARY: The second part of the report should include a summary of the problem which might cover one or more of the following areas:

   A. Operational feasibility
   (with summary of arguments)

   B. Technical feasibility
   (with summary of arguments)

   C. Cost feasibility
   (with summary of arguments)

D. People considerations
(with summary of concerns and considerations)

E. Etc.

The first two parts of the written report should be summarized on the first page of the report.

Why are the RECOMMENDATIONS and the EXECUTIVE SUMMARY put up front? So that those who read the report will not have to read to waste time finding the answers to the problem. Putting the recommendations up front will enhance chances that the report will be read and favorably accepted.

The remainder of the report may include the following sections:

3) RATIONALE: The rationale includes the detailed arguments for overcoming the problem and relates directly to the purpose. The background (rationale) material should speak specifically to the numbered items in the executive summary and include any attachments such as graphs, diagrams, handouts, etc.

4) The important questions to keep in mind when writing a report are:

   A. Is it written in the active voice?

   B. Is it well planned and organized?

   C. Is it as short as it can possibly be without leaving out important details?

   D. Is it written in language which is easily understood?

5) LENGTH OF REPORT: The length of the report will vary depending on the subject matter, the intricacy of the problem, and the understanding of the problem by the audience. Set the length of the report based on your students' understanding of the problems in each case study and their opportunities for growth and development as each study progresses in complexity.

ORAL REPORTS

The standards for the oral reports also should be developed and agreed to by the class. These standards might include:

1) VISUALS. The use of overhead transparencies, slides, handouts, and other visuals will greatly enhance any oral presentation. The same format that was developed for the written presentations could be utilized for the oral reports.

2) INDIVIDUAL PARTICIPATION IN PROJECT REPORTS. It must be made clear to members of the groups making oral reports that evaluations will be based on individual contributions to the reports as well as the group's overall presentation.

3) PREPARATION. PRACTICE! PRACTICE! PRACTICE! Practice cannot be overstated as preparation for oral reports.

Note to instructor: Suggested evaluations forms for oral and written presentations are included in the "Evaluation" section.

TEAMWORK

Teamwork is the glue that makes an office, department, or company run smoothly. Offices, departments, and organizations are made up of individuals who must work together with common goals and objectives.

Within the automated office, many persons working together accomplish projects such as inputting data, creating correspondence, working with customers, handling complaints, etc. Support professionals never work alone. Their ability to work with others is one of the critical elements of career success. Although it is true that technical skills are critical to obtaining a job, it is the human relations/teamwork skills which will ensure keeping the job and moving up in the organization. Individual input is important, but teamwork is the factor on which most employees' performance is evaluated.

Teamwork is defined as (1) knowing how to cooperate with others to accomplish a common objective, (2) giving support to others on issues important to them in order to obtain their support on ours; and recognizing that being a good team player is important in the game.

(Note to instructor: Exercise 4-1 is a teamwork exercise which begins to create awareness of the importance and advantages of teamwork. There are many other exercises which may be used in the classroom. The main point is the resulting feeling of commitment to the value of teamwork.)

Advantages of teamwork which may result from this exercise include:

- Get more work done
- Share success
- Save time
- Emerging talents
- Shared risk
- Better planning
- More ideas
- Have more fun
- Share failure
- More interesting
- Increased communication
- Set the stage for future associations
- Cooperation
- Less stress and pressure
- ...Others (from student input)

Encourage discussion among students regarding the importance of teamwork in the office. The results of not being a team player might include: dead-end jobs, lower performance ratings and less money, lack of promotability, and ultimately, loss of job, etc.

There are many opportunities in this course for students to be part of a project team. The instructor's encouragement in, support of, and attitude toward teamwork will enhance students' participation and success as team members. This is a vital skill for students to acquire.

SUMMARY: At the end of this course, students should have developed an increased awareness of the complexities of the issues of information systems in the automated office.

APPLIED INFORMATION SYSTEMS

Task Area 5

Given a variety of information systems problems, the student will be able to apply problem solving techniques to information systems challenges including overcoming the incompatibility of hardware and software; assessing the need for documentation and training support for end users of hardware and software; developing the procedures for safeguarding and protecting information and automated equipment; searching for vendor support and reliability, including debugging and documentation; using planning and organizing skills for implementation of and/or upgrading of automated systems to continue to meet the needs of the organization; designing the layout for implementing information systems applications within the automated office; or others to the satisfaction of the instructor.

Suggested teaching strategies: It is strongly suggested that project teamwork and the case study teaching methodology be combined in this course. It is expected that outside readings and research skills will be applied to the resolution of the problems in the case studies. Analysis of the case studies and the oral presentations of the project teams should make up at least 75 percent of this course. **Suggested oral and written evaluation instruments are included in the "Evaluation" section.** The standards for the written and oral presentations and the value of teamwork were developed in Task Area 4.

In this section of the course, students are given the opportunity to apply what they have learned from hands-on experience with a variety of software packages, as well as familiarity with database, telecommunications, and networking concepts and terminology. This section of the course attempts to point up the strength in the systems approach; i.e., automation in all areas of the organization with access to common databases which enhances the reduction of duplication across the organization.

System is defined as related elements of the organization or office which are linked together through a set of common goals and objectives. Information systems can be defined as the integration (linking together) of the human, organizational, and electronic resource systems in an organization which makes it possible to access, process, and disseminate information for effective decision making. The common element in information systems is access to information.

A variety of people work in information systems. Information systems workers are workers in the office who will be affected by changes created by integration of information technology, job procedures, and working relationships in the automated office. The jobs that are available for information systems workers include all levels of administrative support personnel, such as data entry, correspondence specialists, administrative specialists; office automation trainers (employed by organizations or vendors); programmers; systems analysts who may be employed as telecommunications, networking, or office automation specialists; supervisors of information centers, word processing centers, or information processing centers; and managers of Information Systems, Computer Systems, or Administrative Services. Each of these workers will view information systems from a different perspective but with the same goal in mind--the capability of accessing, processing, and disseminating information throughout the organizational system which will enhance decision making and reduce duplication of effort. (Note to instructor: Assign outside readings in information occupations to students to share with the class. The outcome of these discussions should be a better understanding of the skills and responsibilities of various information workers.)

A number of information systems case studies and/or problems are presented below. It is strongly suggested that project teams be formed to research, analyze, and present findings for each of them. If the class is big enough, assign each problem or case study to one group. If the class is the size of a good project team, assign the case studies as time permits. Endeavor to cover more than two of the problems so that a variety of problems encountered in the automated office will be covered. Research and analysis of the case study and/or problem will be covered in an oral presentation of the findings.

The intent of this course is to develop and PRACTICE skills in problem solving and decision making. Each of the case studies presented here should take at least two weeks to analyze, research, develop solutions, and make oral presentations. A number of approaches could be taken in order to enhance student involvement and learning:

(1) Choose one of the cases (from Exercises 5-1 through 5-6) to work on as a class. Go through the entire problem solving process together: define the problem; obtain the facts as they are presented and perceived; identify the people who should be involved in analyzing and solving the problem; discuss possible solutions; list the barriers to the problem and the solutions; select

alternative solutions; and evaluate the solution.

(2) Ask students or project teams to analyze all of the cases from the perspective of an information worker in a certain position: support professional, supervisor of a Word Processing Center, training specialist, information specialist, telecommunications specialist, etc. (much like Case Study #1).

(3) Assign the same case study to more than one group or individual and compare solutions. This should present lively class discussions, especially since solutions will include justifications.

(4) Redesign the cases to keep them as up to date as possible.

(5) Assign students to bring in one case study from their outside readings which they will analyze, research, and propose a solution other than the solution chosen by the particular organization. This would add a "real world" flavor to the case studies.

Copies of the case studies are included in the "Student Materials" section as Exercises 5-1 through 5-6.

****

The following suggestions are offered for Exercise 5-1 and Exercise 5-6:

EXERCISE 5-1: As preparation for this case study, prepare a list of items to be included in the documentation, e.g., error codes, transaction codes, file layouts, access instructions, etc., for each position mentioned above. This will delineate the needs of the documentation for each position.

EXERCISE 5-6: As a group, answer the following questions before proceeding with this case study:

1. What kinds of office positions does this agency have?
2. What are the skills of these employees?
3. What kinds of data are stored in the agency's computer at the present time?

4. What kinds of documents are produced for this agency? Determine which documents will be used in-house and which documents will go outside the agency.

5. Prepare an organizational chart (broad overview of insurance agency).

6. Develop a simple data flow diagram, showing movement of records and data between entities within the organization.

7. Determine the number of persons in the organization who will need access to the insurance agency's database.

8. Determine how data will be accessed. PC to host? CRT to host? Will data be downloaded on to PC to be manipulated and uploaded to the mainframe or file server?

9. Determine the software needs of the agency (in general terms): word processing, integrated, spreadsheet, database management, communications, graphics, etc. Determine which off-the-shelf database management programs can accommodate the requirements for these applications.

10. Determine the kinds of printers needed to accommodate the documents: nonletter quality, letter quality, near-letter quality, laser, intelligent printer/copier, etc.

11. Determine what hardware will run the chosen software: computers, modems, telephone systems, etc. in general terms.

12. Determine what kind of security measures will (must) be taken.

13. Determine if a programmer will be needed to develop any other kinds of applications.

14. Determine if plans and physical accommodations have been made for growth and expansion.

15. Find a suggested configuration in a computer textbook which might apply to this situation.

16. Discuss the costs which must be considered in order to effect the benefits desired by management.

******

Applied Information Systems

course five

Visuals

INFORMATION

DEFINED AS DATA
IN THE FORM OF
WORDS, NUMBERS,
SYMBOLS, GRAPHICS,
VOICE, VIDEO
WHICH EXPRESS AN IDEA
OR WHICH CAN BE
MEANINGFUL INTERPRETED.

ONE OF THE MOST IMPORTANT
ASSETS OF AN ORGANIZATION

AIS-2

**THE MOVE TO AN
INFORMATION SOCIETY
IS CHANGING
THE "OFFICE"
FROM A LOCATION
TO THE CONCEPT
OF AN OFFICE
AS A SYSTEM OF
PEOPLE WORKING TOGETHER
TO CARRY OUT TASKS
WHICH HANDLE
INFORMATION.**

THE INFORMATION SOCIETY HAS CREATED THE FOLLOWING CHANGES IN THE "OFFICE":

A NEW WORK ENVIRONMENT
NEW REPORTING RELATIONSHIPS
NEW ORGANIZATIONAL STRUCTURES
NEW OFFICE PROCEDURES
NEW SKILLS
NEW TITLES: INFORMATION WORKERS
NEW CAREER OPPORTUNITIES

FLEXIBILITY IS THE KEY SKILL!

WHITE-COLLAR WORKERS
ARE NOW CALLED
INFORMATION WORKERS.
THEY INCLUDE:

MANAGERIAL
PROFESSIONAL
TECHNICAL
SECRETARIAL
CLERICAL
SALES WORKERS

(BUREAU OF LABOR STATISTICS)

INFORMATION MANAGEMENT IS:

THE PROCESS OF
PLANNING
ORGANIZING
DIRECTING
AND
CONTROLLING THE
KIND OF
AMOUNT OF
ACCESS TO
AND
MANIPULATION OF
INFORMATION INTO USABLE FORMATS
FOR ORGANIZATIONAL CONSUMPTION.

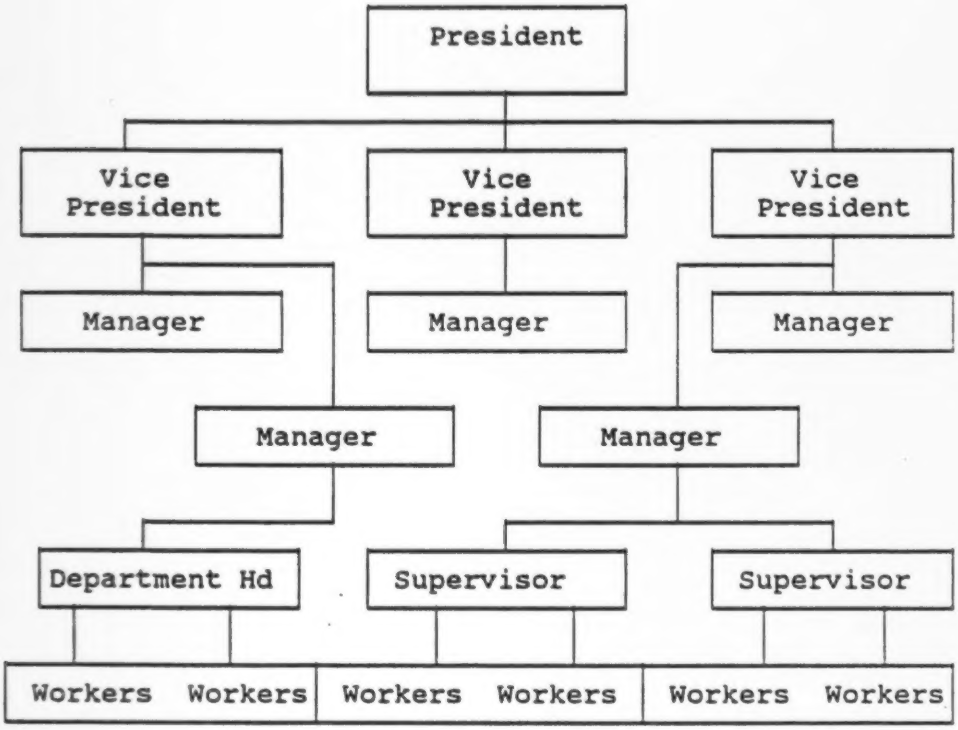
President
Vice President
Vice President
Vice President
Manager
Manager
Manager
Manager
Manager
Department Hd
Supervisor
Supervisor
Workers
Workers
Workers
Workers
Workers
Workers

Figure 1.

TRADITIONAL
ORGANIZATION

MATRIX ORGANIZATION

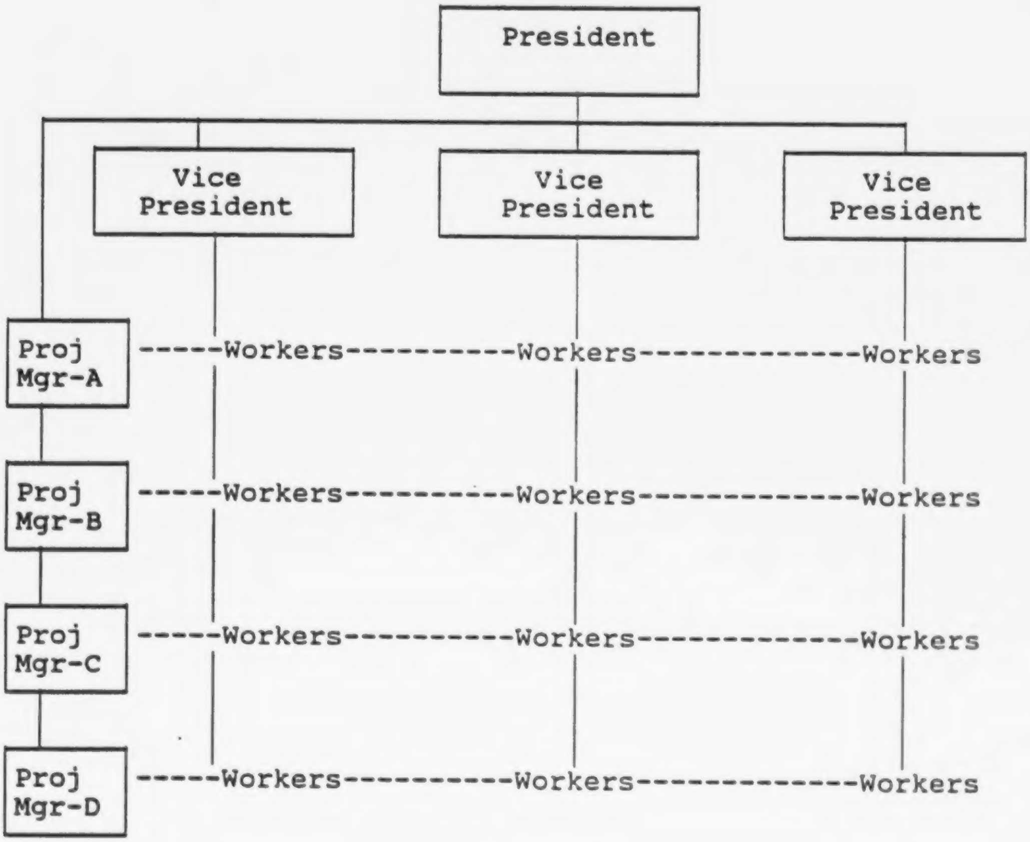
President
Vice President
Vice President
Vice President
Proj Mgr-A
-----Workers----------Workers-------------Workers
Proj Mgr-B
-----Workers----------Workers-------------Workers
Proj Mgr-C
-----Workers----------Workers-------------Workers
Proj Mgr-D
-----Workers----------Workers-------------Workers

Figure 2.

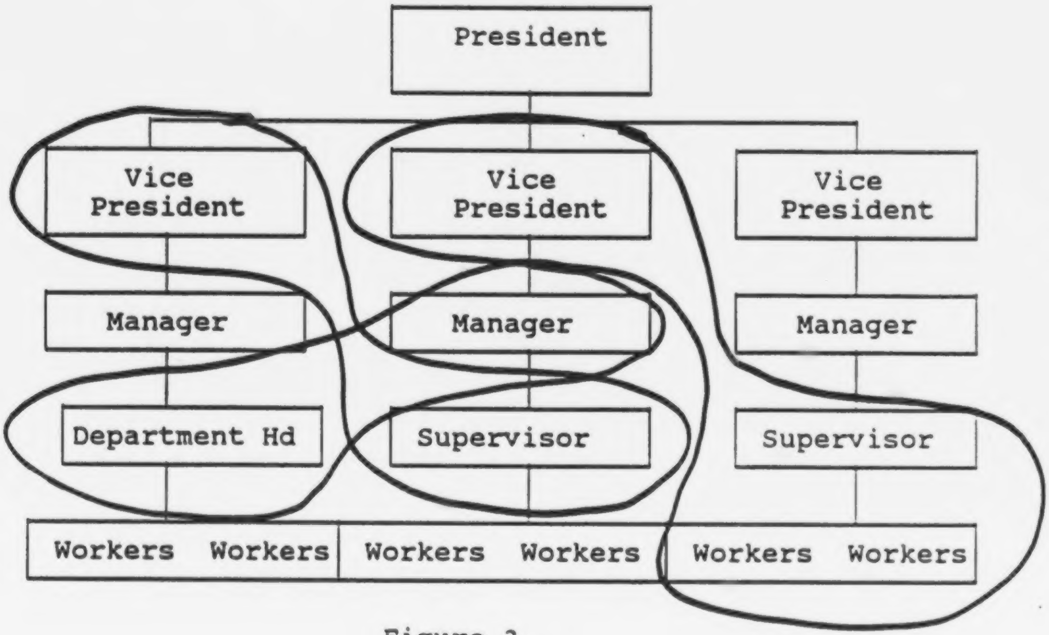
President
Vice President
Vice President
Vice President
Manager
Manager
Manager
Department Hd
Supervisor
Supervisor
Workers
Workers
Workers
Workers
Workers
Workers

Figure 3.

RETICULAR ORGANIZATION

INFORMATION RESOURCE MANAGEMENT (IRM)

RESPONSIBILITY FOR
INFORMATION MANAGEMENT
RESTS IN ONE DEPARTMENT
ALTHOUGH EQUIPMENT
IS DISTRIBUTED THROUGH
THE ORGANIZATION

RESPONSIBILITIES INCLUDE:
PURCHASING RECOMMENDATIONS
TRAINING END USERS
SYSTEMS ANALYSIS AND DEVELOPMENT
LATEST INFORMATION MATERIALS
STANDARDS FOR COMPATIBILITY
INFORMATION SYSTEMS PLANNING
INFORMATION SYSTEMS UPGRADING

ISSUES IN INFORMATION MANAGEMENT

1. OWNERSHIP

WHO HAS ACCESS TO WHAT DATA?
WHO "OWNS" THE DATA?
FOR WHAT PURPOSE?
WHICH DATA ARE USED
TO GENERATE WHICH REPORTS?

2. SECURITY

WHAT ARE THE BACK-UP PROCEDURES
FOR WHAT DATA AND HOW OFTEN ARE
THEY BACKED UP?

3. INDIVIDUAL PRIVACY

WHAT CONTROLS ARE PLACED ON
DATA SO THAT ONLY AUTHORIZED
PERSONNEL HAVE ACCESS TO THE DATA?

4. SOFTWARE PIRACY

WHAT DOES THE SOFTWARE LICENSE
AGREEMENT AUTHORIZE THE USER TO DO?

5. ETHICS

WHAT IS THE ORGANIZATION'S
(MANAGEMENT'S) ATTITUDE TOWARD
INFORMATION?

FEDERAL LEGISLATION RELATED TO INFORMATION

FREEDOM OF INFORMATION ACT
1966

***

FAIR CREDIT REPORTING ACT
1970

***

FEDERAL PRIVACY ACT
1974

***

EDUCATION PRIVACY ACT
1974

***

FEDERAL COPYRIGHT LAW
1976
(RELATED TO SOFTWARE PIRACY)

***

RIGHT TO FINANCIAL PRIVACY ACT
1978

***

NARRATIVE OF COMPUTER LEGISLATION TO ACCOMPANY TRANSPARENCIES

(a) Personal data issues. One law, Federal Privacy Act, passed in 1974, has established limits on the personal information that is kept in government files. This law is intended to prevent any misuse of information about individuals in governmental files. This law is based on the CARTS principle that personal information in federal files must be Complete, Accurate, Relevant, Timely, and Secure. Another law, Freedom of Information Act, passed in 1966, gives people the right to see data that government agencies and businesses are keeping about them. Still another, the Fair Credit Reporting Act, passed in 1970, gives individuals control over the distribution of data about themselves. This law allows people to see the credit records that businesses keep about them.

(b) Two other privacy acts have been enacted to ensure privacy of student records and financial information: The Education Privacy Act, enacted in 1974, ensures the privacy of students records on file with schools that receive federal funds. In most cases, students are asked if their names can be given to outside agencies. The Right to Financial Privacy Act, passed in 1978, gives individuals the right to review information about themselves that is maintained by banks, credit bureaus, and other related financial institutions.

(c) The Federal Copyright Law, passed in 1976, makes duplicating commercial software disks without permission of the publishers as illegal as copying and distributing photocopies of documents and books. This is called software piracy. Hundreds of millions of dollars are lost by manufacturers of software programs because software is being copied for friends, neighbors, and co-workers. This kind of crime is hard to detect; manufacturers are having to rely on the personal integrity and ethics of individuals to deter this crime. Other more drastic measures may include using software encryption to alter a software program when it is copied or putting software programs on firmware chips which are built into computers and cannot be copied.

Individuals and organizations which do not recognize or obey these laws are displaying unethical behavior. However, many times it is difficult to prove that laws are being broken; or else the cost of enforcement may outweigh the benefits. It is imperative that organizations and individuals within the organization publish and maintain a set of professional ethics as it relates to data ownership, intellectual property, and software piracy. These are critical issues that will become even larger as the amount of and access to information proliferates.

INFORMATION MANAGEMENT SKILLS

CRITICAL INTERPERSONAL SKILLS INCLUDE

#1: HUMAN RELATIONS

STILL CONSIDERED TO BE
THE TOP PRIORITY
COMPETENCY FOR OFFICE EMPLOYEES
AS WELL AS

GOAL SETTING
CARE IN APPEARANCE
GOOD SELF CONCEPT
COMMUNICATIONS
COPING WITH CRITICISM
TEAMWORK
PROBLEM SOLVING
DECISION MAKING
HANDLING CONFLICT
COOPERATIVE ATTITUDE
ENTHUSIASM
PUNCTUALITY
FLEXIBILITY
CONFIDENTIALITY
LEADERSHIP
INITIATIVE
CREATIVITY
FOLLOWING DIRECTIONS
ABILITY TO HANDLE PRESSURE
HONESTY
DEMONSTRATED PROFESSIONALISM

INFORMATION
MANAGEMENT
SKILLS

CRITICAL COMMUNICATIONS SKILLS
INCLUDE

VERBAL
NONVERBAL
WRITTEN
LISTENING

TO ALL LEVELS OF
THE ORGANIZATION

STILL CONSIDERED TO BE
ONE OF THE TWO TOP PRIORITY
COMPETENCIES FOR OFFICE EMPLOYEES.

INFORMATION MANAGEMENT SKILLS

CRITICAL TECHNOLOGICAL SKILLS

INCLUDE KNOWLEDGE OF AND SKILLS IN HOW TO USE:

DICTATING MACHINES
VDT'S
COMPUTER GRAPHICS
MAGNETIC MEDIA STORAGE
STORAGE/RETRIEVAL
E-MAIL
FACSIMILE
TELECONFERENCING
EXECUTIVE WORKSTATIONS
DISTRIBUTED LOGIC
DECISION SUPPORT SYSTEMS
SUPPORT PROFESSIONAL WORKSTATIONS

INFORMATION MANAGEMENT SKILLS

CRITICAL MANAGEMENT SKILLS INCLUDE

SETTING OBJECTIVES
CONTROLLING AND MANAGING TASKS
ORGANIZING AND SCHEDULING
EXHIBITING SELF DISCIPLINE
BEING FLEXIBLE
MAKING DECISIONS
SOLVING PROBLEMS
BEING RESPONSIBLE

INFORMATION MANAGEMENT SKILLS

CRITICAL BUSINESS SKILLS INCLUDE

KNOWLEDGE OF ORGANIZATION'S MISSION, PRODUCTS AND SERVICES

KNOWLEDGE OF ORGANIZATION'S WORK AND WORK PROCEDURES

KNOWLEDGE OF ORGANIZATION'S ATTITUDE TOWARD CHANGE

HUMAN CONCERNS BROUGHT ABOUT BY NEW TECHNOLOGY

ORGANIZATION OF WORK
INTRODUCTION OF COMPUTERS
PATTERNS OF ORGANIZATION
SOCIALIZATION OF PEOPLE
ISOLATION BY COMPUTERS
RESISTANCE TO CHANGE

"THERE CAN BE NO HIGH TECH WITHOUT HIGH TOUCH."

--JOHN NAISBITT, MEGATRENDS

CHALLENGES TO SUCCESSFUL AUTOMATION

- -

INTEGRATION
HOW, WHEN, WHERE, WHY, WHAT

TRAINING

PRODUCTIVITY

CHANGES TO ORGANIZATION STRUCTURES

NEW CAREER PATHS

NEW SKILLS

ETHICS, SECURITY, PRIVACY, VALUES

PROCEDURES

COPING WITH CHANGE

PROBLEM-SOLVING STEPS

1.
DEFINE "PROBLEM"

2.
COLLECT RELEVANT DATA

INVOLVE THE RIGHT PEOPLE
IN THE PROCESS

3.
DEVELOP POSSIBLE SOLUTIONS
AND WEIGH THE CONSEQUENCES
OF EACH SOLUTION

4.
SELECT ALTERNATIVES

5.
MAKE THE DECISION
DO IT!

6.
EVALUATE THE OUTCOME

7.
BEGIN AGAIN

INFORMATION SYSTEMS

IS THE

INTEGRATION OF 3 ENTITIES:

HUMAN

ORGANIZATIONAL
(AND ADMINISTRATIVE PROCEDURES)

AND

TECHNOLOGICAL

WHICH MAKES IT POSSIBLE
TO ACCESS, PROCESS, AND DISSEMINATE
INFORMATION FOR
EFFECTIVE
DECISION MAKING

INFORMATION SYSTEMS WORKERS

WILL BE AFFECTED

BY CHANGES CREATED BY

INFORMATION INTEGRATION

NEW TECHNOLOGY

CHANGING JOB PROCEDURES

AND

NEW WORKING AND
REPORTING RELATIONSHIPS.

CAREER OPPORTUNITIES FOR INFORMATION WORKERS

SUPPORT PROFESSIONALS
AT ALL LEVELS

OFFICE AUTOMATION TRAINERS
(VENDORS AND ORGANIZATIONS)

PROGRAMMERS

SYSTEMS ANALYSIS

TELECOMMUNICATIONS SPECIALISTS

NETWORKING SPECIALISTS

MARKETING SALES REPRESENTATIVES

SUPERVISORS
INFORMATION CENTERS
WORD PROCESSING CENTERS
INFORMATION SYSTEMS CENTERS

MANAGERS
CIS
MIS
DP

Applied Information Systems

course five

Student Materials

APPLIED INFORMATION SYSTEMS

Exercise 1-1

STUDY OUTLINE

The intent of this study outline is to make you aware of the highlights of Applied Information Systems. Your goal will be to understand the details which will be presented and relate them to these general ideas. Feel free to fill in the details of they become available to you.

1. Why is the traditional view of the office changing?

2. What are some of the problems associated with this change?

3. Contrast traditional management with information management.

4. How will the success of the automated office be measured?

5. Define the following terms:

    (a) information management
    (b) office automation
    (c) information
    (d) reticular organization
    (e) matrix organization
    (f) information resource management
    (g) privacy
    (h) information worker
    (i) office
    (j) data security
    (k) Federal legislation related to privacy and data security

6. What are some of the skills that are necessary to be successful in the automated office? Why are these skills important?

7. What are the levels of employees in the organization which are affected by office automation? How?

8. Draw an organizational chart for a company, organization, or business with which you are familiar. Show the work flow patterns. Have they been changed because of automated technology?

9. What are some of the human concerns in the automated office?

10. How will the position of the information worker be changed in the automated office?

11. What is information resource management (IRM) and what is its value to the automated office?

APPLIED INFORMATION SYSTEMS

Exercise 4-1

Before discussing the advantages of teamwork, put students into teams and ask them to complete a team exercise. Since there are many games that could be incorporated into the classroom, select one that will fit into your classroom circumstances. The game outlined below is only a suggestion.

The objective is to encourage students to think creatively about teamwork, risk taking, failure, and success without telling them what is at stake. Tell them that this is a timed exercise.

Directions

1. Divide the students into teams of five to six players. Depending on the size of the class, you may have fewer players per team or you may have more teams. This works best with at least three teams.
2. Explain that they are to arrive at a team product from the tinkertoys you have given them. (Be sure there are enough of all sizes and shapes to actually come up with some kind of design.)
3. There are no special rules for the team except that it must be a team product. AS AN OBSERVER, DO NOT HELP OR HINDER THE TEAMS.
4. Give the teams about five minutes to decide on their team's design. This design becomes their team goal. Ask each team to tell you when they are ready.
5. When all the teams are ready with their design, tell them they have five minutes to construct their product. Call time half way through; call time at five minutes. Observe each team as it works.
6. At the end of five minutes, have the students look around the room at the other products. Did they meet their goal?
7. Discuss the following questions as a group:
    a. What is different about working as a group?
    b. What were some of the roles that were assumed by the different members of the group?

c. Whose participation was most helpful in the accomplishment of the task? Whose hindered the most? Why?

d. What kind of behavior was helpful?

e. What role did you play in the exercise?

f. What are the advantages of teamwork? List them on the chalkboard or transparency as they are cited by the group.

NOTE: TO LEAD INTO THIS EXERCISE, YOU MIGHT ASK THE STUDENTS TO CONSTRUCT AN INDIVIDUAL MODEL BEFORE DIVIDING THEM INTO GROUPS. AGAIN, ASK THEM TO DECIDE ON AN INDIVIDUAL GOAL (MODEL) TO CONSTRUCT DURING THE FIVE-MINUTE TIME LIMIT.

Although individuals also could work on them, the case studies in Task Area 5 are geared specifically toward teamwork. Transferability to the work place will be enhanced with a focus on project teamwork.

APPLIED INFORMATION SYSTEMS
Exercise 5-1
Case Study #1

One of the most commonly heard complaints in the automated office is that documentation for software and hardware is hard to understand (too technical), hard to use (not in logical or functional order), and incomplete. Many times organizations end up writing their own documentation or purchasing over-the-counter materials from commercial bookstores to supplement the manufacturer's documentation. Your mission in this case study is to find out for yourself whether or not the documentation for one software package is adequate, more than adequate, or less than adequate from the viewpoint of four persons in the automated office.

Obtain a manufacturer's manual for a popular piece of software. As a group project, evaluate the presentation of instructions and information from the standpoint of:

a. the end user: Is it easy to understand? Is it organized in a logical, step-wise fashion for the end user? Is the language easy to understand? readable? What else do you need in order to be able to manipulate the software? To what level of the organization is the documentation written?

Is there a learning disk with the software? How easy is it to use? What would the end user be able to do as a result of working through the learning disk? What important features of the software were omitted from the learning disk? Do you agree with this(these) omission(s)? Is the documentation for the learning disk easy to use? readable? understandable?

b. the information systems trainer: What techniques does the documentation use to present the material? Would it need to be supplemented if you were using it to train the end user? What kind of supplementary materials? How long would it take the end user to become very proficient with just this documentation? What additional training, if any, would be needed? Is it readable? understandable from a student's viewpoint? Would you use it in your training? Would you recommend its use to others?

c. the "systems analyst": (The systems analyst is the person who understands the work-related tasks, the technical aspects of the software and hardware, and how both aspects work together to provide office automation tools. The analyst in this problem is an office automation specialist.) Is the documentation too technical? Does it give the analyst what he/she needs to troubleshoot in case of system failures, disk crashes, or to retrieve deleted documents? Can you tell from reading the documentation if this is the software for your organization? What are the specific features which would enhance the system? Are there any built-in security devices which protect both the end user and the data? Would the end user benefit from its use?

d. the information center supervisor: How long will it take a new information systems worker to manipulate the software, using the documentation? Is it worthwhile to encourage the new worker to review the learning disk? Is the documentation easy to read? understandable? useful for your employees? Will you have to supplement it? with what kinds of materials?

Consider other factors which may have been omitted from this list. After you have done your research and made your analysis, present your findings in written form to your instructor and in oral form to the rest of the class. What is your recommendation?

****

APPLIED INFORMATION SYSTEMS
Exercise 5-2
Case Study #2

(This case study will provide the basis for the next three case studies.)

The total systems concept is embraced by the Troy Manufacturing Company; that is, top management in this company believes that all of the departments are linked together to meet the goals and objectives of the company. The departments include management, purchasing, accounting, billing, sales, production, transportation, research, public relations, and human resources management (including personnel, salary administration, benefits, retirement, and training).

The office system is enhanced by the use of an IBM mainframe to which are linked a variety of personal computers, including IBM AT's, Wangs, and Macintoshes. Within each office, a variety of peripherals are used: dot matrix printers, laser printers, modems, copiers, file servers, OCRs, and facsimiles (telecopiers). A variety of software also is used: word processing, spreadsheet, database, graphics, E-Mail, communications, integrated, and phototypesetting. Several local networks exist within some of the departments, specifically, purchasing, accounting, billing, sales, salary administration, benefits, and retirement.

Your mission in this case study is to define the use that could be made of the automated office system by each of the departments listed above. Define the purposes of each of the departments. Define how each is dependent on the other for specific information. List the specific uses that could be made of the automated system for each department.

After you have done your research and made your analysis, present your findings in written form to your instructor and in oral form to the rest of the class. What is your recommendation?

****

APPLIED INFORMATION SYSTEMS

Exercise 5-3

Case Study #3

The total systems concept is embraced by the Troy Manufacturing Company; that is, top management in this company believes that all of the departments are linked together to meet the goals and objectives of the company. The departments include management, purchasing, accounting, billing, sales, production, transportation, research, public relations, and human resources management (including personnel, salary administration, benefits, retirement, and training).

The office system is enhanced by the use of an IBM mainframe to which are linked a variety of PC's, including IBM AT's, Wangs, and Macintoshes. Within each office, a variety of peripherals are used: dot matrix printers, laser printers, modems, copiers, file servers, OCRs, and facsimiles (telecopiers). A variety of software also is used: word processing, spreadsheet, database, graphics, E-Mail, communications, integrated, and typesetting. Several networks exist within some of the departments, specifically, purchasing, accounting, and billing. These networks consist of the same equipment--either all IBM PCs or Wangs. The network used in these offices is Ethernet by Xerox.

However, several of the other departments (sales, personnel, benefits, retirement) are wanting to network their PCs. As you would suspect, each of the departments has a variety of hardware--some IBM PCs, some Wangs, and some Macintoshes.

Your mission in this case study is to analyze and research the incompatibility which exists in interfacing the IBM PCs, the Wangs, and the Macintoshes. What kinds of interfaces are available which would enable the IBM PCs, the Wangs, and the Macintoshes to communicate with editability with each other? Estimate the cost that would be entailed in setting up the interface. What are the limitations of each interface? Choose one of the departments and show the network layout and the interfaces (including software) which would enable the hardware to communicate.

After you have done your research and made your analysis, present your findings in written form to your instructor and in oral form to the rest of the class. What is your recommendation?

****

APPLIED INFORMATION SYSTEMS
Exercise 5-4
Case Study #4

The total systems concept is embraced by the Troy Manufacturing Company; that is, top management in this company believes that all of the departments are linked together to meet the goals and objectives of the company. The departments include management, purchasing, accounting, billing, sales, production, transportation, research, public relations, and human resources management (including personnel, salary administration, benefits, retirement, and training).

The office system is enhanced by the use of an IBM mainframe to which are linked a variety of PC's, including IBM AT's, Wangs, and Macintoshes. Within each office, a variety of peripherals are used: dot matrix printers, laser printers, modems, copiers, file servers, OCRs, and facsimiles (telecopiers). A variety of software also is used: word processing, spreadsheet, database, graphics, E-Mail, communications, integrated, and typesetting. Several networks exist within some of the departments, specifically, purchasing, accounting, and billing. These networks consist of the same equipment--either all IBM PCs or Wangs. The network used in these offices is Ethernet by Xerox.

However, several of the other departments (sales, personnel, benefits, retirement) are wanting to network their PCs. As you would suspect, each of the departments has a variety of hardware--some IBM PCs, some Wangs, and some Macintoshes.

There is no standard for hardware or software purchases, no procedures for the safeguarding and protecting data or computer facilities, and no standardized document formats in the Troy Manufacturing Company.

Your mission in this case study is to develop a presentation to make to the general manager's staff which would speak to the three areas highlighted above. Your presentation will cover the factors which speak to:

1) **The need for purchasing standards for hardware and software so that effective networking and communications can be established company-wide.**

2) **The need for guidelines for the protection and security of data and facilities throughout the company.**

3) The need for standardized, company-wide document formats which will enhance the speed with which documents can be created and edited. (One argument for document standardization is less editing time when documents are transferred between offices within the company.)

After you have done your research and made your analysis, present your findings in written form to your instructor and in oral form to the rest of the class. What is your recommendation? Remember that the presentation must be benefits-oriented--what will it do for the people involved. A sales approach in the oral presentation will greatly enhance its success.

****

APPLIED INFORMATION SYSTEMS
Exercise 5-5
Case Study #5

The total systems concept is embraced by the Troy Manufacturing Company; that is, top management in this company believes that all of the departments are linked together to meet the goals and objectives of the company. The departments include management, purchasing, accounting, billing, sales, production, transportation, research, public relations, and human resources management (including personnel, salary administration, benefits, retirement, and training).

The office system is enhanced by the use of an IBM mainframe to which are linked a variety of PC's, including IBM AT's, Wangs, and Macintoshes. Within each office, a variety of peripherals are used: dot matrix printers, laser printers, modems, copiers, file servers, OCRs, and facsimiles (telecopiers). A variety of software also is used: word processing, spreadsheet, database, graphics, E-Mail, communications, integrated, and typesetting. Several networks exist within some of the departments, specifically, purchasing, accounting, and billing. These networks consist of the same equipment--either all IBM PCs or Wangs. The network used in these offices is Ethernet by Xerox.

However, several of the other departments (sales, personnel, benefits, retirement) are wanting to network their PCs. As you would suspect, each of the departments has a variety of hardware--some IBM PCs, some Wangs, and some Macintoshes.

There is no standard for hardware or software purchases, no procedures for the safeguarding and protecting data or computer facilities, and no standardized document formats in the Troy Manufacturing Company. Recently, a presentation has been made to the general manager's staff which pointed up the need for purchasing standards, security standards, and standardized document formats. The general manager's staff was in agreement that standards were needed in these areas and a committee was appointed to make recommendations in each of these areas.

Your mission is to serve as the committee which will accomplish the following:

1) Make recommendations for purchasing hardware and software (specific brands) with justification for your choices.

2) Make recommendations for security procedures for the mainframe facilities, as well as protection of data stored on hard disks, back-up policy, and other data stored on magnetic media.

3) Make recommendations for standardized document formats with justification for your recommendations.

After you have done your research and made your analysis, present your findings in written form to your instructor and in oral form to the rest of the class. Specifically mention in your recommendations whom (level of employees) you contacted for input into your recommendations, how the process was set up to make your final recommendations, and how you think your recommendations will be accepted by the persons affected.

****

APPLIED INFORMATION SYSTEMS
Exercise 5-6
Case Study #6

During the past 10 years, the office staff of the Gardiner-Johnson Agency, a small insurance business with one central office location, has increased from 15 to 50. This is a rapid growth in the office staff, with no corresponding increase in supervision. Also, the office system has become obsolete. The president of this small company recently has announced that the Gardiner-Johnson Agency will be opening three neighborhood locations and a number of the staff will be transferred to the new locations.

As the supervisor of the office staff, you have repeatedly told the president that the small computer system in place has become obsolete and that there is no way of monitoring the efficiency of the office. Now seems to be the perfect time to make an approach to accomplish two things: install an up-to-date information system which will connect the four offices together and, at the same time, track and monitor the efficiency of the offices. The president seems to be receptive to your suggestions.

Your mission is to prepare a report covering the following, taking into consideration costs and realistic parameters:

1) Recommend a specific automated office system (hardware and software) for the company, including communications capabilities between offices (E-Mail and transferability with editability) and access to the database by all offices.

2) Design the basic office layout, showing terminal locations for workers in the records, accounts payable/receivable, sales, and policies departments which would be workable at all four locations. The three neighborhood offices will have the same dimensions: 2000 square feet and 8 employees at each location. The headquarters office has double that amount: 4000 square feet and 16 employees.

3) Recommend the kinds of training for the end users, including sales and management staff, on the new system. Recommend who should do the training.

Be sure that your report includes the reasons for your specific recommendations, including the tracking of efficiency of the staff and the system; vendor/manufacturer reputation for support and reliability; evaluation of the hardware and software documentation; and recommendations for maintenance and service contracts.

After you have done your research and made your analysis, present your recommendations in written form to your instructor and in oral form to the rest of the class.

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Applied Information Systems

course five

Evaluation

APPLIED INFORMATION SYSTEMS

Test 1

1. Why is the traditional view of the office changing?

2. What are some of the problems associated with this change?

3. Contrast traditional management with information management.

4. How will the success of the automated office be measured?

5. Define the following terms:

   information management

   office automation

   information

   reticular organization

   matrix organization

   information resource management

   privacy

   information worker

   office

   data security

6. What are some of the skills that are necessary to be successful in the automated office? Why are these skills important?

7. What are the levels of employees in the organization which are affected by office automation? How?

8. Draw an organizational chart for a company, organization, or business with which you are familiar. Show the work flow patterns. Have they been changed because of automated technology? (Use the back of this page.)

9. What are some of the human concerns in the automated office?

10. What is information resource management (IRM) and what is its value to the automated office?

11. (Extra credit) How will the position of the information worker be changed in the automated office?

CRITIQUE OF ORAL PRESENTATION

The statements below should be evaluated according to the following scale:

5 - Excellent	2 - Fair
4 - Good	1 - Unacceptable
3 - Average	

NAME OF PRESENTOR ______________________________

TOPIC OF PRESENTATION ______________________________

DATE OF PRESENTATION ______________________________

Please circle the number which best indicates your feeling toward the presentation.

1. The manner in which speaker introduced himself/herself 5 4 3 2 1

2. The manner in which topic was introduced 5 4 3 2 1

3. Identification of objectives in the presentation 5 4 3 2 1

4. Manner in which presentation was organized 5 4 3 2 1

5. Manner in which presentation was delivered 5 4 3 2 1

6. Degree of enthusiasm projected 5 4 3 2 1

7. Degree of effectiveness of presentation to students 5 4 3 2 1

8. Degree of professionalism exhibited during the presentation 5 4 3 2 1

9. Use of visual aids or materials during presentation 5 4 3 2 1

10. Degree to which the audience was included in the presentation 5 4 3 2 1

OVERALL POINTS FOR PRESENTATION ______________

Comments: ______________________________

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CRITIQUE OF WRITTEN REPORT

The statements below should be evaluated according to the scale provided after each component:

NAME OF WRITER ______________________________

TOPICS OF REPORT ______________________________

DATE OF REPORT ______________________________

Please circle the number which best indicates the evaluation of the report.

1. The physical aspects of the report: (page layout, margins, form and content of title page, placement and spacing of captions, neatness, etc.) 5 3 1

2. The organization of the report: (logic in arranging information, wording of captions, etc.) 10 8 6 4 2

3. Content and analysis of the report: (adequacy of coverage, pertinence, quality and quantity of information, completeness of introductory material, logical analysis) 15 13 11 9 7

4. Quality of writing of the report: (style: dullness, interest quality, objectivity; readability: clarity, conciseness, completeness, sentence structure, word choice; coherence: appropriate summary, conclusion, and forward-looking parts) 20 18 16 14 12

5. Graphics included in the report: (suitability, correctness, appearance) (5 4 3 2 1)

OVERALL POINTS FOR REPORT ______________

(Total may be more than 50 points if graphics are included.)

Comments: ______________________________

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Applied Information Systems

course five

References

Computer Law 1988

by Jordan J. Breslow

The American legal system changes slowly. By sharp contrast, technology appears to be changing at an accelerating pace. Innovations in computer technology have sometimes created problems which the legal system was ill-equipped to handle. During the past few years, however, the law has begun to catch up with the computer world. Copyright law now protects the "look and feel" of computer programs. Federal and state laws make it a crime to gain unauthorized access to someone else's computer system. And the federal wiretap law has been updated to restrict governmental eavesdropping on communications sent by modem.

Copyright Law

Most computer software is protected by copyright law. To the user, this means that making copies of programs and sharing them with friends and co-workers is a violation of federal law. But copyright law also affects users in a more subtle way. Because software manufacturers rely on copyright law to prohibit the sale of products that resemble their own too closely, copyright law can affect the number of competing products available to the user.

During the past few years, the courts have strengthened the protection which copyright law provides to computer software. Judges have been asked to apply one of the most fundamental rules of copyright law—a rule conceived hundreds of years ago— to the newborn technology of computer software. The rule is that ideas cannot be copyrighted.

Suppose you're an artist and you paint a picture of a boy riding a horse in a meadow. Your artwork consists of an idea—the idea of a picture of a boy riding a horse in a meadow—and an expression of that idea on canvas. The idea is not protected by copyright. Any other artist is free to paint his own picture of a boy riding a horse in a meadow. But your expression, i.e., the actual picture you painted, is yours alone. If another artist copies your picture, he has infringed your copyright.

There is a line somewhere between unprotectible ideas, which imitators can copy, and protected expression, which cannot be copied without copyright infringement. Where do you draw that line when considering a computer program, such as a word processor? At one extreme, the basic idea of a program that processes words cannot be copyrighted. If it could, there would only be one word processor on the market. At the other extreme, the actual programming code (source code) which makes a particular word processor work is an expression which is clearly protected by copyright.

Between these two extremes lie program features which are harder to classify as unprotected ideas or protected expression. What about a program's keystrokes, for example. Can a word processing program adopt Wordstar's keystrokes? Quite a few programs on the market do. Sidekick, for example, uses the Wordstar commands for such things as moving text and moving the cursor. What about a program's menus? Are they unprotectible ideas which anyone can imitate, or expression which are protected by copyright?

The answers to questions like these may determine how many inexpensive "compatible" or "clone" programs will be on the market in years to come. That's why lawyers and software vendors are talking about a decision by Judge Orrick in a case in federal court in San Francisco. Judge Orrick's decision may affect the availability of clone software in years to come.

The combatants squaring off before Judge Orrick were Broderbund Software, which sells The Print Shop, and Unison World, which sells Printmaster. Both programs allow users to create signs, banners and the like. Printmaster was designed to resemble the overall structure, sequence and arrangement of The Print Shop's screens. Judge Orrick ruled that the structure, sequence and arrangement of screens was an expression, not just an idea. And the judge went on to explain that the "total concept and feel" of Printmaster was similar to "total concept and feel" of The Print Shop.

The Broderbund decision has been loosely referred to as the "look and feel" case. Many commentators believe that under *Broderbund*, a clone or compatible program which looks and feels exactly like the program it imitates will be an illegal infringement. If that analysis is correct, the future of inexpensive copycat programs will be in doubt.[1] Strong copyright protection for computer programs is not necessarily bad for the consumer, however. Copyright gives programmers an economic incentive to develop new software. In the absence of strong copyright protection, creative software companies would spend money on product development only to find their products cloned and sold at lower prices by companies who had not paid for the development.

In future copyright cases, the courts will be striking a balance between the principle that ideas should be free for all the world to share and the tenet found in the United States Constitution that artists, authors, programmers and others should be rewarded for their creativity.

Hackers Beware

It's 10:00: do you know where your data is? Perhaps the teenage whiz kid next door is snooping through it. Or

Copyright [illegible]

maybe a disgruntled former employee is browsing through the personnel records on your hard disk. If so, call the police, the attorney general or the FBI. Computer snooping is now a crime.

Unauthorized access to computer systems, nicknamed hacking, received a great deal of attention in the media, in Congress and in state legislatures around the country. When the problem first came to light, the media sometimes characterized hacking as a pesky but harmless activity by clever pranksters. But the public soon realized that the potential for harm is enormous. For example, in 1983 a group of youngsters calling themselves the "414 Gang" broke into a computer system at Memorial Sloan-Kettering Cancer Center in New York. The intruders gained access to the radiation treatment records of over 6,000 patients, and had the ability to alter the radiation treatment levels prescribed for individual patients.

At least 47 states have now passed laws which establish criminal penalties for electronic voyeurism. California's legislature, for example, resolved "to discourage 'browsing,' which has led to significant destruction of property and numerous instances of invasion of privacy, as well as to punish the more serious offenders . . ." It is therefore illegal to "maliciously" access a computer system and alter, delete or damage a computer system. Malice roughly means an intent to do harm. Simply accessing a computer without authorization is also a crime.

The Federal counterpart is the Computer Fraud and Abuse Act of 1986. The federal law generally pertains to computer crimes which are committed across state lines, or which involve the government's computers. Crimes under this act include

- Obtaining information contained in a financial record of a financial institution or information contained in a consumer credit agency's file
- Obtaining unauthorized access to U.S. Government computers
- Altering data concerning an individual's medical condition in a computer
- Giving out passwords or codes for gaining unauthorized access to computers

Uncle Sam Wants Your Data

The United States Constitution was designed to protect citizens from abuses of an overzealous government. The First Amendment, for example, protects our access to information through the right of free speech. Other provisions of the Constitution protect our right to privacy, limiting the right of the government to spy on its citizens.

When the Constitution was written, the technological ability of the government to snoop and eavesdrop was quite limited. In recent years, the government's ability to control information has taken on frightening dimensions with the proliferation of computer-to-computer communications by modem.

Who Is Reading Your Electronic Mail?

After the telephone was invented, law enforcers found a new way to fight crime: listening in on private telephone conversation by means of a wiretap. In 1967, the Supreme Court declared that wiretaps were subject to the Fourth Amendment to the Constitution, concerning search and seizure. Congress then passed the Omnibus Crime Control and Safe Streets Act of 1968—the Federal wiretap law.

The wiretap law protects citizens from unwarranted governmental intrusion into private telephone conversations. It allows a wiretap only if certain procedural safeguards are observed. But by 1986 the wiretap law was hopelessly out of date. Due to the narrow definition of wiretapping, the law did not apply to new technologies such as electronic mail, cellular and cordless telephones, paging devices and video teleconferencing.

Making matters worse, the constitutional protection of privacy was thought not to apply when information was in the hands of a third party computer operator. Thus, prior to the passage of the Electronic Communications Privacy Act of 1986 (ECPA), a letter which you sent to a friend via an electronic mail service was open to the government's prying eyes, at least while it was stored in the computers of the mail service. Neither the wiretap law nor the Constitution deterred overzealous law enforcement agents.

The ECPA closed this loophole. The act struck a balance between the right of privacy and the legitimate role of the government in law enforcement. In general, communications which are stored in the computers of an E-mail service for 180 days or less can only be read by the government if it first obtains a search warrant. If the communication is stored there beyond 180 days, the government must follow prescribed procedures, generally including prior notice to the sender of the message, before it can snoop.

The Legal Future

Changes in technology will most likely continue to outpace changes in the legal system for years to come. But as attorneys, judges and legislators become more familiar with computers and the unique legal problems they create, the legal system will do a better job of protecting the interests of computer users, manufacturers, the government and the public. ■

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[1] *This is legally inaccurate. If one program looks and feels like another, it is an infringement only if the clone program imitates aspects of the original program which are protected expression as opposed to unprotected ideas. For example, suppose one program displays nothing but blank lines on a screen, so the monitor looks like a piece of ruled paper. That screen display is probably an unprotected idea. If a clone program displays the same screen, it may look and feel like the original, but it is not an infringement, because it only looks and feels like an unprotected idea.*

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LICENSE AGREEMENT BETWEEN SOFTWARE MANUFACTURER AND PURCHASER

The small print on the outside of all software packages carries the following WARNING for the software purchaser and end-user:

"This product is for sale and distribution within the United States only. Customer support and updates for this product outside the U.S. are subject to a surcharge levied locally. Opening this package indicates your understanding and acceptance of the following Terms and Conditions (all emphases added by this writer):

"READ THE FOLLOWING TERMS AND CONDITIONS BEFORE OPENING THIS SEALED PACKAGE. IF YOU DO NOT AGREE WITH THEM, PROMPTLY RETURN THE UNOPENED PACKAGE TO EITHER THE PARTY FROM WHOM IT WAS ACQUIRED OR TO (NAME OF MANUFACTURER) AND YOUR MONEY WILL BE REFUNDED.

"The program in this package is a proprietary product of (name of manufacturer) and is protected by Copyright Law. (Manufacturer) retains title to and ownership of the program."

License

"You may use the program on a single computer or move the program to and use it on another computer, but under no circumstances may you use the program on more than one computer at the same time. You may copy the diskettes either in support of your use of the program or for backup purposes.

"You may permanently transfer the program to another party if the other party agrees to accept the terms and conditions of this License Agreement. If you transfer the program, you must at the same time transfer all copies of the program to the same party or destroy those not transferred. Such transfer terminates your license. You may not rent, lease, assign, or otherwise transfer the program except as stated in this paragraph.

"You may not decompile, disassemble, or otherwise reverse engineer the program. You may not modify the program in any way without the prior written consent of (the manufacturer)."

PERSONAL COMPUTER HARDWARE AND SOFTWARE USE POLICY

OF ____

Effective April 1987

In compliance with legal considerations and in keeping with ethical practices upheld by ______________________________, all employees--exempt, non-exempt, and hourly--will be responsible for knowledge of and adherence to the following guidelines related to use of personal computer hardware and software:

1. Use of all computer equipment, both hardware and software, purchased for __________________________ use is restricted to related business.

2. Each copy of purchased software programs is registered and protected by federal copyright laws and, therefore, may not be copied for home or other use. Copying for work-related use may be done only within the requirements allowed by copyright laws, and only with the approval of authorized computer center personnel.

3. Unauthorized copying of registered software programs or use of related hardware equipment for other than business is strictly forbidden and subject to discipline.

4. Only authorized computer service personnel may alter or adjust programs or equipment. Alternations or adjustments by anyone else is strictly forbidden and subject to discipline.

It is necessary for the users of ____________________________ computer hardware and software to be responsible for sharing this policy with anyone who requests the use of its hardware or software.

ATTITUDE TEST REGARDING

ETHICS OF INFORMATION PROCESSING

Directions: Place a check mark in the space provided which most nearly reflects your opinion of the situation presented.

1. In the department in which you work, the computer programmer runs programs at work which are homework assignments for the courses she is taking at the local junior college. The programs are run when the computer is idle; that is, not being used for departmental business.

   Ethical _____ Unethical _____ Computer crime _____

2. A student in a computer class gives out a password to other students (roommates) who are not enrolled in the class. The students in the class are required to pay a laboratory fee. The password permits access to the departmental VAX. One of the roommates uses the password to access the VAX for two hours to complete an assignment for another class.

   Ethical _____ Unethical _____ Computer crime _____

3. A support professional uses the electronic spreadsheet from work on her personal computer at home to do a moonlighting job. The licensing agreement that came with the software when it was purchased by the company indicates use of the software is authorized only for her microcomputer on the job. The support professional argues that it is unfair to have to pay $500.00 for the software package to use just once at her home.

   Ethical _____ Unethical _____ Computer crime _____

4. A copy of a computer program developed by a programmer on the job is given to a friend at school.

   Ethical _____ Unethical _____ Computer crime _____

5. While accessing and updating personnel records in the Insurance Department, the clerk accidentally accesses the records for the Salary Administration Department. This means that the clerk broke a security code and had access to confidential salary information. When confronted with the illegal information on the computer screen, the clerk only smiled and said, "I guess I pushed the wrong keys." The clerk did not make any use of the information.

   Ethical _____ Unethical _____ Computer crime _____

6. There are software programs on the market which allow users to duplicate word processing, spreadsheet, or database management programs, or other applications software even though the manufacturer has built in copy protection features. You buy such a program and make a copy of a word processing program for backup purposes only.

   Ethical _____ Unethical _____ Computer crime _____

7. While your boss is out of the office, the support professional reporting to your boss's boss comes in and accesses your boss's voice mail, even the "confidential" mail. You ask her if she is authorized to do this and she says that her boss told her to do it.

   Ethical _____ Unethical _____ Computer crime _____

8. A friend who works for your competition asks you to send her a copy of a computer program which was developed by your departmental programmer. This program had to do with downloading and uploading data related to production figures from the microcomputer to the mainframe.

   Ethical _____ Unethical _____ Computer crime _____

9. Sometimes on the job you use your computer to complete work totally unrelated to the job. For example, you may type papers (your own and others for which you are paid), set up database management files for outside volunteer organizations, or keep books for a small business. You use your idle time to complete these tasks; but also you use company materials for printing, diskettes for storing, and work time for completing the tasks.

   Ethical _____ Unethical _____ Computer crime _____

(Adapted from COMPUTER FUNDAMENTALS FOR AN INFORMATION AGE, Gary B. Shelly and Thomas J. Cashman, 1984. Brea, CA: Anaheim Publishing Company, Inc.)

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